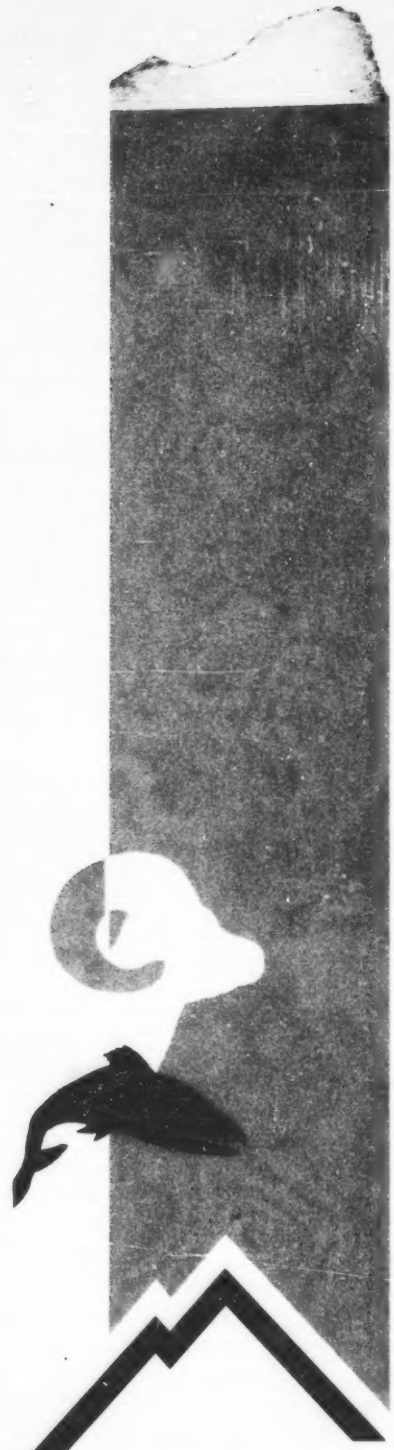
2000/2001 Program
Fish & Wildlife
Project Handbook

A Guide For Projects And Partners In The Columbia Basin



Columbia Basin

FISH & WILDLIFE Compensation Program

CBFWCP is an initiative between BC Hydro and the BC Government (Ministry of Environment, Lands & Parks, BC Fisheries) to conserve and enhance fish and wildlife populations in the Columbia Basin affected by BC Hydro-related dams activities.

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Fish & Wildlife Compensation Program
Columbia Basin

Columbia Basin Fish & Wildlife Compensation Program
103 - 333 Victoria Street
Nelson, BC V1L 4K3

Editor, Barry Bartlett

Canada Post 03458180
agreement number 1616447

Dear Partner & Stakeholder:

The Columbia Basin Fish & Wildlife Compensation Program is delivering 21 fish and 38 wildlife projects for a total of 59 projects with an unprecedented 123 partners for the 2000-01 project year.

The number of fish projects reflects the costs associated with the Kootenay Lake and Arrow Lakes Reservoir (ALR) fertilization projects, which combined account for nearly one million dollars of the Program's $1.6 million fish project budget this year. We appreciate the feedback we've received from partners and stakeholders, including local conservation groups, that restoring the Arrow and Kootenay ecosystems are critical fisheries priorities in the Columbia Basin at this time. We are pleased to report that preliminary results from fertilizing in the Upper Arrow are already showing positive results. Algae production at the bottom of the food chain, a key indicator, has more than doubled from the first two years of fertilizing.

New Application Deadline August 1

The annual project application deadline has been changed from October 1 to *August 1* beginning this year. The Program found that the October 1 deadline didn't allow staff biologists sufficient time to discuss proposals with applicants before completing the review and approval process. We contacted as many groups and agencies as possible in the spring to inform prospective applicants of the new deadline. A number of groups responded which resulted in the approval of 11 small works projects to date this year. However, we were missing contact information for some groups who, as a result, may not have received the notice. *Please provide us with your up-to-date contact information including: contact name, mailing address, phone and fax numbers and email address.* Interested groups who may have missed the August 1 deadline can still submit applications under the Small Works Program during the project year. The Small Works Program is for small fish or wildlife projects by local community groups up to $10,000. Interested groups should discuss their projects with staff biologists before submitting applications.

Changes in Representatives

The Program recently completed a public nomination process for two of three public representative volunteer positions on the Steering Committee in which local groups were asked to submit candidates. The two new public reps are Richard Spilker for southwestern Kootenays and Pat Wells for northern Kootenays. Richard takes over from Grace Conzon and Pat is replacing Alan Chell. In addition, Joe Nicholas has been appointed by the Ktunaxa-Kinbasket Tribal Council as one of the First Nations' reps on the CBFWCP Steering Committee. Spilker and Wells join southeastern public representative Jim Zimmerman from Elkford who's term ends December 31.

CBFWCP Launches Website

The Compensation Program is very pleased to offer a 'one-stop shop' resource on fish and wildlife projects as well as reports, project application packages and links to related agencies and organizations at **cbfishwildlife.org**. Let us know what you think of our website and any way we can improve our communications with you.

Sincerely,

Maureen DeHaan, *Program Manager*

M121

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Co-chairs Report

1999/2000 marked the fifth anniversary of the Columbia Basin Fish & Wildlife Compensation Program. The Program delivered 44 fish and wildlife projects with 60 partners, including 15 projects involving species at risk. Over the five years, CBFWCP has undertaken a total of 325 projects with the support of 276 partners.

The year also saw an internal review of the Program's performance to date to identify and begin implementing improvements such as streamlining internal business processes.

An **Administrative Agreement** was completed which formalized the Program's relationship with its partnering agencies, BC Hydro and the BC Government (Ministry of Environment, Lands & Parks, BC Fisheries).

The Administrative Agreement reinforces the two primary objectives of CBFWCP: to meet the obligations of BC Hydro to compensation for impacts to fish and wildlife from hydroelectric developments as contained in BC Hydro's water licences; and to conserve and enhance fish and wildlife populations consistent with the mandates and policies of the **BC Government** and the objectives of **BC Hydro**.The agreement also recognizes the contributions of local conservation groups and First Nations by setting aside a minimum of $50,000 for fish and wildlife small works projects to ensure continued funding is available for locally-initiated projects. The maximum is $10,000 per project.

The Program also began formalizing an agreement with **The Nature Trust of BC** regarding the acquisition and management of land purchased for conservation. To date, CBFWCP has secured over 2,630 hectares (6,496 acres) of land in the Columbia Basin for its wildlife values.

On the projects side, the fertilizing of the **Arrow Lakes Reservoir** (ALR), a formidable and expensive undertaking, also began in 1999-2000. While the ALR project was based on the highly successful **Kootenay Lake fertilization project**, the ALR presents more difficult technical challenges because of the wide fluctuations in water levels. However, we are pleased to report that after two years of accelerated studies and one year of fertilizing from the Galena Bay ferry, algae abundance has increased two and one-half times in the Upper Arrow Lakes.

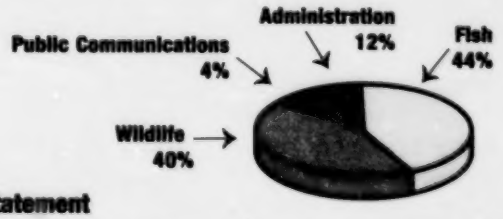
Projects like the lake fertilization, as well as our work with species at risk, also resulted in an increase in recognition for the Program at all levels. The **Vancouver Sun** printed a two-page feature on CBFWCP while an article on the fertilization projects in the Japan-Canada Journal instigated a visit from Japanese government officials to determine if our successes can be applied to deal with lake productivity issues in Japan. A number of our other fish and wildlife projects involving cougar-prey ecology, Townsend's big-eared bat, northern leopard frogs, rubber boas, painted turtles and other species at risk were featured in a variety of high-profile media including **Discovery Channel**, **Knowledge Network** and **Beautiful BC** as well as a host of partner publications. While recognition for the Program's work is always appreciated, this media exposure helps CBFWCP meet its commitment to sharing information and informing the public regarding hydro fish and wildlife compensation activities relating to the Columbia River Basin.

The **Steering Committee** continues to be satisfied with the quality and effectiveness of CBFWCP fish and wildlife projects and, with the Administrative Agreement in place, anticipates this performance will carry on into the future.

Dave Cattanach, ***Rick Morley***
CBFWCP Steering Committee Co-chairs

Financial Report

The 1999-2000 fiscal year began with a carry over of just under $200,000 from 1998-99 and a fund deposit of $3,432,980 for a total budget of $3,632,479 for the year. Expenditures in the four program areas remained relatively constant compared to last year. The fish budget remained at 45% of the total Program with the continuation of the Kootenay and Arrow fertilization work consuming the lion's share of the $1.5 million. The wildlife budget dropped by only 1%, with no land acquisition opportunities being pursued at this time. Administration costs rose by 1% primarily due to the review of internal processes and the need to make some minor changes. Overall the Program experienced a 6.7% variance for the year, under spending by $244,463 which is carried over to the 2000-01 fiscal year.



Financial Statement

ITEM	CREDIT	EXPENDITURE	BALANCE

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Projects like the Lake Fertilization [illegible] species at risk, also resulted in numerous communications [illegible] Program at all levels. The **Vancouver Sun** featured a two-page feature on CBFWCP while articles on the fertilization project in the Japan-Canada Journal intrigued visitors from Japanese government officials to determine if the process can be applied to deal with their problem lakes in Japan. A number of other fish and wildlife projects involving unique partnerships, historical background for northern leopard frogs, rubber boa, painted turtles and other species at risk were featured in a variety of high profile media including **Discovery Channel**, **Knowledge Network** and **Beautiful BC** as well as a host of partner publications. While recognition for the Program's work is always appreciated, the media exposure helped CBFWCP live up to its commitment to sharing information and educating the public regarding hydro fish and wildlife compensation issues relating to the Columbia River Basin.

The **Steering Committee** continues to be instrumental in the quality and effectiveness of CBFWCP's fish and wildlife projects. With the Administration Agreement in place, the Committee's performance will carry on into the future.

Dave Cattanach Rick Morley
CBFWCP Steering Committee Co-chairs

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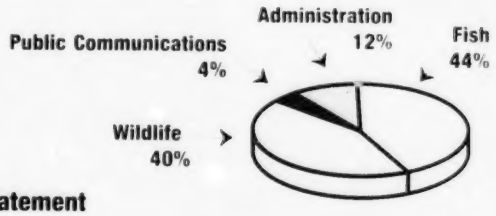

Financial Statement

ITEM	CREDIT	EXPENDITURE	BALANCE
Carry over from March 31/98			$199,499
Fund Deposit	3,432,980		3,632,479
Fish Program		1,507,309	2,125,170
Wildlife Program		1,338,620	786,550
Public Communications		149,243	637,307
Administration		392,844	244,463
TOTAL		$3,388,016	

Fish and Habitat Enhancement Projects

Columbia Basin

FISH & WILDLIFE
Compensation
Program

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BC hydro

British Columbia

ARROW LAKES RESERVOIR

HILL CREEK HATCHERY & SPAWNING CHANNEL OPERATIONS

Project **#F-95-L-010**

Project Leader: Grant Thorp, Fisheries Technician (Nakusp)

The Hill Creek Hatchery, in operation since the early 1980's, was constructed to increase ***kokanee***, ***bull trout*** and ***rainbow trout*** populations in the ***Arrow Lakes Reservoir*** impacted by the construction of Keenleyside and ***Revelstoke Dams***. Funding covers basic operations, maintenance and evaluation of the facility including a spawning channel, wells, hatchery and aeration building. This operation also includes projects to evaluate fish-stocking in the Arrow Lakes Reservoir such as ***creel surveys*** and kokanee fry/adult enumeration. One of the goals of the Hill Creek Hatchery is to support ***Arrow Reservoir's*** sport-fishing activities. Hatchery staff are also involved in Arrow Reservoir fertilization activities including fertilizer distribution from the Galena Bay Ferry and follow-up monitoring.

Project Duration: Ongoing

ARROW LAKES RESERVOIR FERTILIZATION & MONITORING

Project **#F-97-NL-019**

Project Leader: Bob Lindsay, Fisheries Biologist (Nelson)

The ***Arrow Lakes Reservoir*** has been heavily impacted by the construction of three dams: the ***Keenleyside Dam*** in 1968, the ***Mica dam*** in 1973 and the ***Revelstoke Dam*** in 1981. The flow patterns and nutrient-loading of the Arrow Reservoir have been changed, impacting the native fish populations by flooding and/or blocking migration to spawning and ***rearing*** habitat, altering water quality and decreasing reservoir productivity.

In addition, mysid shrimp introduced by fisheries managers into the reservoir in 1968 as a food source for young trout were found to compete with kokanee for the same zooplankton food source.

In the mid 1990's, kokanee stocks showed a general decline in spawner escapement and size in both the Upper and Lower Arrow.

Two years of intensive studies (1997-99) confirmed that nutrient-loading is considerably below historical levels, making a full-scale ***fertilization*** program on the Upper Arrow, the most depleted of the two basins, necessary to restore ***productivity***.

The Arrow fertilization project, similar to the highly successful Kootenay Lake project, entails dispensing a special blend of nitrogen/phosphate fertilizer from the Galena/Shelter Bay ferry on a weekly basis between April and August. After the first year of fertilizing in 1999, phytoplankton (algae) abundance had increased two and one-half times in the Upper Arrow. While it is too early in the project to quantify if the fertilizing is benefiting fish populations, many anglers are reporting they are catching more and bigger kokanee in both the Upper and Lower Arrow this year than they have in many years.

Detailed sampling is being conducted in tandem with the fertilizing to ensure the nutrient additions are having the desired effect on restoring reservoir productivity and to allow a quick response time for necessary adjustments to the fertilizer mix.

As well as conserving fish populations, fertilization is benefiting the local sport fishery and providing a better food source for wildlife predators and scavengers (bears, eagles) by increasing the number of kokanee spawners.

Interpretive signs have been erected at the ferry landings with take-away brochures to help raise public understanding of the impacts of the dams and support for the fertilization project.

Project Duration: Ongoing

Partners: **Ministry of Transportation & Highways; Columbia Power Corporation; University of British Columbia**

Bold and italic text – see Glossary for more information

ARROW LAKES RESERVOIR TROUT RADIO TELEMETRY Project **#F-97-M-021**

Project Leader: Karen Bray, Fisheries Biologist (Revelstoke)

The life history of ***bull trout*** is poorly understood and requires extensive research, including the identification of critical habitats for staging, spawning and rearing. The most effective means of obtaining life history and fish behavior information is by using radio ***telemetry*** which saves considerable time, effort and expense. Similar work on bull trout in the Duncan River system (1995-98) generated useful information on fish behavior and habitat-use that would have taken years to produce using any other tracking means. In 1998/99, tags were implanted in 38 bull trout and four rainbow trout. The tagged fish are regularly monitored by both aerial and ground-based tracking. This project will help identify critical bull trout habitat areas which can then become the focus of future work, such as inventory or habitat restoration.

Project Duration: Year 3 of 4

Partners: **Local Anglers**

ARROW/KINBASKET RAINBOW TROUT STOCK ID & DISTRIBUTION Project **#F-98-M-024**

Project Leader: Karen Bray, Fisheries Biologist (Revelstoke)

The original ***Arrow Lakes "yellow fin" rainbow trout*** is still believed to be found in small numbers in the Arrow system. Rainbow trout with similar colouration have been found in the Kinbasket Reservoir, Revelstoke Reservoir and Camp Creek near Valemount, where the majority of the Arrow yellow fins are thought to have spawned before the construction of the Mica Dam.

Most of the historical information available on the yellow fin is anecdotal and there is a lack of baseline data to confirm the rainbow strain's genetic uniqueness.

Biologists are completing the genetic analyses on rainbow trout in Arrow and Kinbasket Reservoirs from data compiled over the past two years. Genetic analysis results will be compared with other possible yellow fin populations to determine similarities and differences with other rainbow strains, including Gerrard rainbow trout. If fish from the upstream reservoirs appear to be of the same stock, then a management plan can be developed to help conserve the yellow fin strain.

Project Duration: Year 3 of 3

Partners: **University of BC; local anglers**

UPPER COLUMBIA

UPPER COLUMBIA BURBOT Project **#F-96-M-017**

Project Leader: Steve Arndt, Fisheries Biologist (Nelson)

Burbot populations in Kootenay Lake and the Columbia River below Hugh Keenleyside Dam were officially ***red-listed*** in late 1999. A freshwater member of the cod fish family, this species is poorly understood in western Canada. Columbia Lake appears to have a stable burbot population, but human developments along the lakeshore are a concern.

Biologists are operating a weir and trap to monitor the spawning run on one tributary of Columbia Lake. This will allow for the collection of valuable life-history data on the longevity and number of spawning events of individual fish. At the same time, a UBC graduate student has studied the habitat requirements and abundance of young burbot during their first two years after hatching.

A total of 152 burbot spawned in the tributary this winter, about double the 1999 numbers but still only 10% of spawners in 1996 and 1997. A large number of returning fish was expected based on the abundance of fish from the 1997 spawning event at younger ages. However, growth rates were very slow in 1999 and the 1997 burbot brood may have delayed maturity until age 4.

Findings to date indicate that all burbot spawning in the monitored tributary come from the lake itself and not further down in the Columbia River system as was previously suspected. In addition, a creel survey is providing evidence of other burbot spawning areas in Columbia Lake.

Project activities for 2000/01 will focus on continued sampling to monitor the number of spawners from the 1997 brood. Depending on spawning numbers this year, this project may be extended an additional year.

Project Duration: Year 5 of 5

Partners: **University of BC**

Bold and italic text – see Glossary for more information

UPPER COLUMBIA KOKANEE SPAWNER SURVEYS Project **#F-96-L-015**

Project Leader: Bill Westover, Fisheries Biologist (Cranbrook)

The ***kokanee*** population in the ***Kinbasket Reservoir*** has increased dramatically following egg-plants in the mid 1980's. An important sport fish and a key food source for bull trout, kokanee spawner numbers now range between 500,000 and one million a year in the reservoir system.

Aerial surveys of the Upper Columbia drainage were undertaken in 1996, 1997 and 1998 to provide an index of escapements and to identify important spawning streams. Survey activities were suspended in 1999 and are resuming this year but limited to Upper Columbia tributaries. This project is anticipated to continue indefinitely to provide an annual index of kokanee trends with basin-wide counts to be conducted every five years. The surveys will provide effective annual adult kokanee escapement indices for the reservoir and a means of assessing trends to help measure the impacts of reservoir fluctuations on kokanee production.

Duration: Year 4 of 5

Partners:

UPPER KOOTENAY

UPPER KOOTENAY BULL TROUT TELEMETRY PROJECT Project **#F-98-M-023**

Project Leader: Bill Westover, Fisheries Biologist (Cranbrook)

This project is identifying critical spawning habitat, migration routes and holding areas for the ***blue-listed*** (threatened) ***bull trout*** in the Kootenay River mainstem between the ***Koocanusa Reservoir*** and Canal Flats. Bull trout in the Upper Kootenay are known to spawn in the Wigwam River, Bull River, St. Mary's River, Skookumchuck Creek, Lussier River, Findlay River and White River. However, spawning locations within most of these systems are not known. Biologists are capturing and tagging 40 adult bull trout to track to their spawning grounds to gather information to protect their habitat.

Duration: Year 1 of 2

Partners: **Habitat Conservation Trust Fund; BC Hydro; Columbia Basin Trust; Bonneville Power Administration**

KOOCANUSA KOKANEE SURVEY Project **#F-96-L-016**

Project Leader: Bill Westover, Fisheries Biologist (Cranbrook)

Kokanee, introduced to the newly-formed ***Koocanusa Reservoir*** in the mid 1970's, is a major target species in an international fishery on this system as well as a primary food source for bull trout. Over 95% of kokanee production in Lake Koocanusa occurs in British Columbia. Biologists now have four years of data on the abundance of spawning kokanee and have identified some of the most important spawning streams.

This year, biologists are conducting surveys on 10 streams in the Kootenay basin upstream of the International Boundary to gather trend data on these systems such as numbers and peak spawning times. This trend data is essential to understanding the Koocanusa Reservoir kokanee fishery and developing a kokanee management plan for the reservoir.

Information will be shared with biologists from the Montana Dept. of Fish, Wildlife & Parks who are collecting kokanee data including length, weight and sex during their annual fall gillnet sampling activities.

Duration: Year 5 of 5

Partners: **BC Hydro; Montana Dept. of Fish, Wildlife & Parks**

KOOTENAY LAKE

MEADOW CREEK SPAWNING CHANNEL OPERATIONS

Project **#F-95-L-011**

Project Leader: John Bell, Fisheries Technician (Nelson)

Loss of spawning habitat for 2.8 million kokanee occurred with the construction of the Duncan Dam. BC Hydro constructed the Meadow Creek ***Spawning Channel*** in 1967 to compensate for this loss and to conserve kokanee and other fish populations in Kootenay Lake. CBFWCP is providing funding for the ongoing operations, upgrading, maintenance and monitoring of this critical ***kokanee*** spawning channel. This includes monitoring adult ***escapement*** and ***fry*** production to measure trends in the kokanee population. In addition, gravel scarification and settling pond cleaning are required annually. In 1999, 1.7 million kokanee returned to spawn in the Meadow Creek Spawning Channel and nearby Lardeau River.

Project Duration: Ongoing

KOOTENAY LAKE FERTILIZATION & MONITORING PROJECT

Project **#F-95-L-012**

Project Leader: Bob Lindsay, Fisheries Biologist (Nelson)

Kootenay Lake has been impacted by the construction of the Libby Dam which flooded a large section of the Kootenay River and by the Duncan Dam which raised Duncan Lake and flooded the lower Duncan River. These dams have permanently changed the flow dynamics and nutrient loading of Kootenay Lake. The dams also affected native fish populations by flooding, blocking migration to spawning and rearing habitat, altering water quality and decreasing reservoir productivity. The decreased nutrient loading resulted in a significant decline in both size and number of kokanee.

The Kootenay Lake Experimental ***Fertilization*** Project began in 1992 and has resulted in significant increases in ***phytoplankton***, ***zooplankton*** and ***kokanee*** abundance. Hydro-acoustics (underwater sonar) survey results showed that total kokanee abundance increased from five million in 1991 to 25-35 million kokanee in 1998. The amount of fertilizer applied in the North Arm was reduced in 1997 after monitoring showed the lake was beginning to retain the nutrients from previous fertilizations. However, both kokanee and phytoplankton abundance showed a significant decrease in 1998 and 1999 and, as a consequence, the amount of fertilizer was increased this year (2000) to the 1997 level.

Biologists are continuing to monitor the mysid shrimp very closely. These shrimp, which compete with kokanee for the same food source, have not increased in abundance to date. However, in the last few years their size has increased in the North Arm which is expected to result in the production of more young.

This project is resulting in major conservation benefits to Kootenay Lake fish populations and the sport fishery, particularly for kokanee, ***bull trout*** and ***Gerrard rainbow trout***. In addition, wildlife predators and scavengers including bears and eagles will benefit from the increased food supply.

Interpretive signs have been erected at the ferry landings with take-away brochures to help raise public understanding of the impacts of the dams and support for the fertilization project.

Project Duration: Ongoing

BASIN WIDE

PROJECT DEVELOPMENT/SMALL WORKS PROJECT Project **#F-95-L-013**

Project Leader: Harald Manson, Senior Fisheries Biologist (Nelson)

Well-planned and coordinated projects using a combination of biologist expertise, volunteer time and limited funds can stretch resources to successfully deliver many small, yet important, fisheries enhancement activities. This project will identify and develop small works projects, collect background information, identify appropriate partners and evaluate completed enhancement projects on an ongoing basis.

To encourage local community involvement and to provide project opportunities for motivated conservation groups, CBFWCP set aside $50,000 this year for projects up to $10,000 for which local groups can submit proposals anytime during the Program year.

The Small Works Project gives CBFWCP some flexibility in working with local groups to deliver less costly projects that arise during the program year. A by-product of working with community groups is increasing the public's understanding and active support of fish and their habitat requirements.

Project Duration: Ongoing

Partners: **Various community groups**

SMALL WORKS PROJECTS - Fish

Geographic Area: Upper Columbia

ILLECILLEWAET RIVER WATERSHED ATLAS Project **#F-98-M-027**

Project Leader: Karen Bray, Fisheries Biologist (Revelstoke)

The Illecillewaet River is a major tributary to the Upper Arrow Reservoir, originating at the Illecillewaet Glacier and discharging at the city of Revelstoke. The river has been subject to a century of human impact as a result of exploration, rail and road construction, logging, and urban development. While many businesses, agencies and groups have an interest in the Illecillewaet River for commerce, conservation or recreation, there is little integrated information on the river system.

The first year of this project involved collecting information and data sets already available on the physical and biological parameters. This second year will focus on the production of a resource atlas on the Illecillewaet River watershed using the existing information, continuing to collect missing information, developing partnerships, and helping to identify issues and knowledge gaps. The atlas will be developed with GIS technology which will not only allow for spatial and temporal display of information, but will aid in integrating and analyzing the data and allow it to be available online and widely accessible. Future years will focus on completing/updating the atlas and providing analysis tools. The atlas can be viewed on the Columbia Mountains Institute website www.cmiae.org.

Project Duration: year 2 of 10

Partners: **Parks Canada; Columbia Mountains Institute; Funding by Fisheries Renewal BC and Columbia Basin Trust through the Columbia-Kootenay Fisheries Renewal Partnership**

TONKAWATLA RIVER FISH DISTRIBUTION & HABITAT ASSESSMENT Project **#F-98-M-026**

Project Leader: Karen Bray, Fisheries Biologist (Revelstoke)

The Tonkawatla River enters the Columbia River just downstream of the Revelstoke Dam and is the only known spawning stream for the original ***Arrow Lakes "yellow fin" rainbow trout***. This stream is influenced by non-native fish introductions, urban and industrial development, logging activities, and road and rail development.

This project will help to determine habitat-use relationships for resident fish species, such as the distribution of fish and their use of habitats. The information will help identify impacts and will form the baseline against which the effects of any future rehabilitation efforts can be measured. Landowners and the community will be able to use this information in discussing options for the Tonkawatla River with the hope that a stewardship program can be initiated to provide long term rehabilitation and protection for this watershed.

Project Duration: year 3 of 10

Partners: **Local community; Funding by Fisheries Renewal BC through the Columbia-Kootenay Fisheries Renewal Partnership**

Bold and italic text – see Glossary for more information

MARTHA CREEK HABITAT CREATION

Project Leader: Karen Bray, Fisheries Biologist (Revelstoke)

Martha Creek flows into a pool that was formed when the Revelstoke Reservoir flooded the valley, submerged the culvert under the old Highway 23 and blocked fish access from the reservoir to Martha Creek. In addition, BC Parks has identified the pool as a public safety hazard because of a vortex at the inlet of the culvert. Rainbow trout have been confirmed in the creek between the existing highway and the pool.

The Revelstoke CBFWCP Public Advisory Committee (PAC), comprised of representatives from local conservation organizations, helped initiate this project to create 250 meters of a new low-gradient stream channel and restore reservoir access.

The first part of this project was completed last November with the construction of the channel, outlet structure and overflow channel. Once the culvert is completely plugged and the pool level can be maintained, instream structures will be placed into the new channel and planting of the banks commenced.

PAC volunteers will conduct the re-vegetation, structure placement, monitoring and communications while BC Hydro is providing engineering design, construction and excavation contracting. CP Rail is completing the pool lining work and providing the equipment, operator and matting material as well as helping haul a mixture of coarse sand and gravel to the site.

Partners: **CBFWCP Public Advisory Committee; CP Rail; BC Parks; Funding by BC Hydro and EcoAction 2000**

LAKE REVELSTOKE CREEL AND VISITOR USE SURVEY

Project Leader: Karen Bray, Fisheries Biologist (Revelstoke)

The Lake Revelstoke Reservoir Integrated Recreational Plan, developed in 1996 by a community-wide group comprised of local organizations, government agencies and industry, identified visitor use and the status of the sport fishery as important issues to be measured and managed. The last creel survey was conducted in 1993 while a limited angler-use survey took place in 1995. In the meantime, increased recreational use and sport fishing is believed to have increased pressure on local fish populations including the threatened (***blue-listed***) ***bull trout***. Local residents have also raised concerns about the growing problem of garbage and human waste left at informal camping sites along the reservoir.

Funding has been secured to conduct the two-pronged survey between mid April and early September with the assistance of a co-op student. This survey should provide valuable current baseline information on the Lake Revelstoke sport fishery while measuring recreational use of the reservoir as well. Combining the two surveys is an efficient and cost effective way of collecting information which should contribute to identifying environmental, social and economic benefits to the area.

Partners: **Revelstoke Rotary Club; Funding by Columbia Basin Trust, BC Hydro and Human Resources Development Canada**

CAMP CREEK KOKANEE SPAWNER SURVEY

Project Leader: Karen Bray, Fisheries Biologist (Revelstoke)

Camp Creek is considered the most important ***kokanee*** spawning tributary in the Canoe Reach of Kinbasket Reservoir. A clear, low gradient stream with high species diversity, Camp Creek flows from the Cariboo Mountains and parallels Highway 5 before entering the Canoe River near Valemount. Kokanee escapement counts provide an important index of population abundance trends and are an inexpensive and invaluable tool for monitoring productivity trends in large reservoirs of the Upper Columbia. Kokanee populations in Kinbasket Reservoir are an important food source for ***bull trout***, ***rainbow trout***, ***burbot*** and ***sturgeon*** and are an important indicator of reservoir productivity. The Ktunaxa/Kinbasket First Nation has also been evaluating kokanee populations in Kinbasket Reservoir for a potential food fishery.

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Bold and italic text – see Glossary for more information

Currently, counts are focussed on tributaries in the southern portion of Kinbasket Reservoir. Camp Creek data will contribute information from a portion of Kinbasket Reservoir not otherwise included and will help ensure healthy kokanee populations in Kinbasket Reservoir. Escapement counts of kokanee were instrumental in signalling nutrient depletion of Kootenay Lake and Arrow Reservoir. Ground counts in Camp Creek can also provide additional information on locations of spawning bull trout and mountain whitefish.

As well as fill information gaps, this project will facilitate longer-term projects related to fish populations, monitor Kinbasket Reservoir kokanee populations as well as physical, chemical and biological trends in local watersheds for future management purposes, and contribute to more complete information on kokanee populations.

Project Duration: 1Year

Partners: CBFWCP Valemount Public Advisory Committee; Village of Valemount; local residents

LAKE REVELSTOKE WINTER CREEL SURVEY

Project Leader: Karen Bray, Fisheries Biologist (Revelstoke)

While Lake Revelstoke is a valued resource, little information exists on the status of Lake Revelstoke fish populations or its sport fishery. For example, there has never been any information collected on the winter/spring fishery and, in particular, on the harvest of ***bull trout***, a ***blue-listed*** species. The Lake Revelstoke Integrated Recreation Plan (1996) recognized the importance of Lake Revelstoke's sport fishery and recommended it be assessed.

This creel survey will complement the 2000 summer creel and provide complete annual data on the sport fishery. A random creel survey will be conducted along the reservoir from October 2000 to April 2001. The survey will collect information on fish size, sex, age, physical condition as well as angler effort, targeted species, catch, and harvest. Ageing structures and tissue samples may also be collected.

The survey will also establish an important baseline against which future changes can be measured as the reservoir matures and assist with the development of future management initiatives to the benefit of all species.

Project Duration: 1Year

Partners: **Revelstoke Rotary Club; Funding by Fisheries Renewal BC through the Columbia Kootenay Fisheries Renewal Partnership**

LOWER COLUMBIA & KOOTENAY DRAINAGE

MURPHY CREEK SIDE CHANNEL SPAWNER COUNTS & INTAKE MONITORING

Project Leader: Steve Arndt, Fisheries Biologist (Nelson)

The Trail Wildlife Association (TWA) constructed and maintained a side channel of Murphy Creek below Highway 22 in the early 1990's after discovering rainbow trout were unable to access the upper steam because of a highway culvert and the velocity of the current.

A 1998 study determined that over 40,000 rainbow trout fry hatched below the highway culvert, with 75% coming from the side channel. However, spring floods were eroding the rock and concrete walls surrounding the water intake to the side channel, which could result in the loss of a large number of spawning adult and juvenile trout. Last year, a large crew of TWA volunteers and project partners built a new intake to reduce potential blockage problems and maintenance, created a larger settling pond and installed a new pipe and valve. The creek area has been seeded and planted with willow stakes to further stabilize the banks. These enhancements will ensure the continued functioning of this productive side-channel, improve the quality of the spawning gravel and provide cover for spawning adults and winter habitat for juvenile rainbow trout.

The small works project this year is to monitor the numbers of spawning rainbow trout and water levels in the side channel to ensure the new intake is functioning properly.

Project Duration: 1 Year

Partners: **Selkirk College; BC Hydro Youth 2000**

BLUEBERRY CREEK BARRIER EVALUATION & MITIGATION

Project Leader: Steve Arndt, Fisheries Biologist (Nelson)

Blueberry Creek is a tributary of the Columbia River near Trail which provides productive spawning and rearing habitat for rainbow trout. Local residents and the Ministry of Transportation & Highways were involved in evaluating three man-made barriers in the lower reaches of the creek and work has begun to improve fish passage at the two lowest barriers. Volunteers are monitoring fish jumps at the barriers to evaluate the success of past enhancement work and assess opportunities to further improve fish passage.

Duration: 1 Year

Partners: **Trail Wildlife Association; Blueberry Creek Irrigation District; Local Volunteers; Ministry of Transportation & Highways**

SPROULE CREEK CULVERT PASSAGE & REHABILITATION

Project Leader: Steve Arndt, Fisheries Biologist (Nelson)

The Nelson Rod & Gun Club (NRGC) submitted a proposal to CBFWCP to undertake Sproule Creek in-stream habitat enhancements to benefit the spawning and rearing of rainbow trout from Kootenay Lake. A part of Sproule Creek flows through the Marsden Face property purchased by CBFWCP, NRGC and the Rocky Mountain Elk Foundation in 1995 for its ungulate winter habitat and wildlife corridors.

Biologists have collected baseline data on the Compensation Program's portion of Sproule Creek including summer and winter temperatures, out-migrating fry and juvenile densities. Juvenile trout were present as well as large adults during spawning time, but juvenile trout densities were low and channelization has resulted in poor habitat conditions for both spawning and rearing.

A portion of the lower reach is owned by Cominco as well as the Ministry of Transportation & Highways (MoTH) whose highway culvert prevents fish access to upper reaches in some years. An engineer's report recommended the CBFWCP portion of Sproule Creek as well as the adjacent Cominco section be ***rehabilitated*** according to Watershed Restoration manual techniques and that experimental off-channel ponds be constructed in the lower section.

MoTH intends to improve fish passage through the culvert this year when Kootenay River water levels are favourable. A rehabilitation plan will be prepared for the Marsden Face and Cominco properties. Nelson R&G Club members are volunteering to complete the bulk of the work as well as contributing to the funding of the project. The proximity to Nelson offers excellent public education opportunities for Sproule Creek as a demonstration stream for spawning and rearing habitat.

Partners: **Nelson District Rod & Gun Club; Ministry of Transportation & Highways**

UPPER COLUMBIA

SINCLAIR CREEK REHABILITATION PROJECT

Project Leader: Karen Bray, Fisheries Biologist (Revelstoke)

Sinclair Creek flows through Radium and has been impacted by past flood protection measures including channelization and diking. The Village of Radium Hot Springs, in partnership with CBFWCP, is undertaking a stream ***rehabilitation*** project this year to assess this fish-bearing stream and develop habitat rehabilitation prescriptions which will be implemented in summer 2001.

A follow-up project to monitor the effectiveness of the rehabilitation work is recommended, pending the availability of funding. The effectiveness monitoring will include sampling of one or more control streams with similar characteristics to help interpret any changes in fish populations in Sinclair Creek following the rehabilitation work.

Project Duration: 1 Year

Partners: **Village of Radium Hot Springs**

Wildlife and Habitat Enhancement Projects

Columbia Basin

FISH & WILDLIFE Compensation Program

www.cbfishwildlife.org

ARROW

WEST KOOTENAY UNGULATE ENHANCEMENT PROJECT

Project **#W00NL017**

Project Leaders: John Gwilliam, CBFWCP Wildlife Biologist (Nelson)
Ross Clarke, Wildlife Biologist (Nelson)

This project combines previously separate ***enhancement*** projects, as well as new projects for this year, to provide a more comprehensive and effective enhancement strategy for West Kootenay habitat and wildlife populations. This involves the Pend d'Oreille/South Salmo, Arrow Lakes Valley, Crawford Creek/Arrowhead and CBFWCP Duncan/Lardeau property enhancement projects.

Low elevation, south-facing slopes provide critical winter habitat for elk and deer in the West Kootenay. Fire traditionally played a key role in maintaining a mosaic of mature coniferous and open, early seral-stage (phase after natural disturbance such as forest fire) habitat. The primary focus of this project is maintaining these early seral conditions on ungulate winter range to mimic historical natural disturbance patterns. Planned activities for this project year include:

Project Development

Lower Arrow Lakes: develop and initiate an enhancement plan for the Broadwater and Deer Park properties following NDT4 (natural disturbance type, fire-maintained ecosystem) guidelines to enhance habitat affected by conifer encroachment and fire suppression.

Creston area: investigate prescribed burning opportunities in the Kitchener Mountain and Little Moyie River areas in cooperation with the Creston Rod & Gun Club.

Arrow Lakes Valley—Broadwater Area: investigate slashing Douglas-fir ingrowth on 20 hectares.

Arrow Lakes Valley—Hamlin Creek: develop an old-growth enhancement treatment plan using slashing and/or thinning techniques on the CBFWCP/BCE property.

Arrow Lakes Valley—Hutchinson Creek: reinvestigate the burn site to assess the feasibility of preburn slashing to create hotter temperatures; Johnson Creek: investigate prescribed burning opportunities; Rosebud Lake: In consultation with local residents, complete the planning for a prescribed burn in 2001 to benefit elk.

Upper Arrow—Wallis Creek: develop an enhancement plan to create small openings on CBFWCP/BC Environment property; Crawford Creek: extend the ungulate enhancement plan to include the winter range from Revelstoke south to Arrowhead and east to the Incomappleux River.

Project Implementation

Arrow Lakes Valley: The south slopes adjacent to the Arrow Lakes provide winter habitat for deer, elk and ***moose***. To maintain and improve habitat values, biologists are conducting NDT4 restoration activities on CBFWCP/BCE Broadwater and Deer Creek properties and prescribed burns at Johnstone Creek.

Pend d'Oreille/South Salmo River Valleys: the south slopes above the PDO River provide winter habitat for white-tailed deer while the slopes above the South Salmo River provide winter habitat for ***mule deer***, elk and ***Rocky Mountain bighorn sheep***. CBFWCP is undertaking a variety of vegetation-manipulation activities this year to improve ungulate browse and cover values:

- conducting a 60-ha prescribed burn near McCormick Creek and two burns (60 ha) near Wallack Creek;
- conducting 20 person-days of slashing willow, maple and Saskatoon that have grown out of reach of browsing mule deer and elk in South Salmo's Lost Creek area;
- planting 200 Douglas-fir seedlings on CBFWCP/BCE Limpid Creek property;
- undertaking 10 person-days of manual slashing above the confluence of the South Salmo River and Stagleap Creek to rejuvenate bighorn sheep and mule deer browse values;
- slashing of decadent shrub cover on CBFWCP property near Myres Creek; and
- slashing 10 ha south of Rosebud Lake.

Bold and italic text – see Glossary for more information

Kootenay Lake: CBFWCP has been implementing a wildlife management plan to enhance the 203 ha of CBFWCP property in the Meadow Creek area. Activities included this year are wetland ***rehabilitation***, conifer planting and slashing of browse species.
Revelstoke: slashing deciduous shrubs and conifer ingrowth on a 10-15 ha site near Crawford Creek.

Project Monitoring
Monitoring of enhancement activities is necessary to determine the success of these wildlife projects. Biologists are continuing vegetation monitoring of past enhancement activities at Crawford Creek, establishing pre-treatment plots on proposed burn sites, and inputting and summarizing monitoring data collected to date.
These three phases for habitat management are necessary on a long-term basis to measure the effectiveness in conserving wildlife populations. Benefits include improved moose, elk and mule deer winter browse values as well as increased wildlife viewing and hunting opportunities.
Project Duration: Ongoing
Partners: **Habitat Conservation Trust Fund; Selkirk College; Ministry of Forests**

WEST KOOTENAY MULE DEER PROJECT Project **#W96-M-006**
Project Leader: John Gwilliam, CBFWCP Wildlife Biologist (Nelson)
The management and conservation of ***mule deer*** populations, declining in the West Kootenay, continue to be top priorities both locally and regionally. This five-year co-operative project is gathering information on mule deer population levels, movements, habitat use and mortality in the South Salmo River and Corn Creek drainages. Mule deer have been equipped with radio collars that are monitored by aircraft on a regular basis.
As part of this project, dead collared deer are located and examined to determine their cause of death. To date, 20 of 42 collared deer have died, with 50% of the documented mortalities attributed to cougars.
Year 5 will see the data analysis and management plan completed. This increased knowledge of mule deer densities, survivorship and migration patterns should result in improved mule deer management.
Project Duration: Year 5 of 5
Partners: **Washington State University; Washington Department of Fish & Wildlife; Ministry of Forests, Small Business Division; Malcolm Dennington (local volunteer); BC Environment**

SALMO RIVER HARLEQUIN DUCK INVENTORY Project **#99-NS-120**
Project Leader: John Krebs, Senior CBFWCP Wildlife Biologist (Nelson)
Harlequin ducks are declining throughout their North American range and yellow-listed (monitored, not endangered) in BC. Their decline is due to a number of factors including: dam construction and reservoirs, logging, mining and shoreline developments which are impacting the availability of breeding grounds; deforestation erodes streamside nesting areas and causes siltation which affects the Harlequin's freshwater invertebrate food supply; and human recreational use of the duck's breeding habitat affects reproduction because of the species' intolerance to disturbance.
A unique migratory duck, the Harlequin winters and moults along the BC coast and migrates to undisturbed, turbulent mountain rivers and streams to breed and feed on aquatic insect larvae.
A pre-incubation survey in 1999 found 33 males and 18 female Harlequins using the Salmo watershed. A follow-up brood survey observed only three successful broods (2, 3 and 4 ducklings respectively), which is consistent with the low reproductive rates of other locations in BC as well.
This project is now conducting systematic pre-incubation and brood surveys of the Salmo River mainstem and major tributaries as well as detailed habitat samplings of sites with high levels of brood activity to compare with sites occupied by broodless females. The goal is to produce a report summarizing inventory and habitat findings that provides recommendations to land management agencies regarding important Harlequin breeding sites and habitats. There will also be additional opportunities for public involvement through the awareness campaign and Harlequin sightings network coordinated by the Salmo Watershed Streamkeepers Society.
Project Duration: Year 2 of 2
Partner: **Salmo Watershed Streamkeepers Society**

SOUTH SELKIRK COUGAR ECOLOGY & PREDATION STUDY Project **#W98-M-125**

Project Leader: Ross Clarke, Wildlife Biologist (Nelson)

Cougars are a major contributor to the high rates of mortality incurred on mule deer and ***red-listed*** Mountain Caribou populations in the South Selkirk. However, biologists need to understand how cougars interact with caribou and other ungulates to aid in identifying the most effective options for conserving this caribou population.

Biologists have trapped and radio-collared 11 cougars to date with the assistance of local houndsmen. This year's activities, which include increasing the sample size of radio-collared cougars to 20, will help determine their distribution, movement patterns, prey selection and general habitat use. Radio-collared cougar are tracked weekly in conjunction with ongoing ***mule deer*** and white-tailed deer aerial tracking.

Data collected in 1999 indicated that three caribou mortalities were attributed to cougars. The project has been extended to five years to achieve the targeted sample size and to support the South Selkirk ***Mountain Caribou*** Recovery Plan. Upcoming activities include: continued aerial telemetry in conjunction with the West Kootenay Mule Deer Study; snow trailing; kill site investigation; and analyzing seasonal movement and home range data collected over the first two years of the project. This project is supporting a parallel effort currently underway in Idaho and Washington.

The primary goal of this project is to help find ways to reduce or reverse the losses of the South Selkirk caribou population. Results should also assist in management recommendations and improve knowledge of habitat requirements and home range needs for cougars in the South Selkirk Mountains. Mule deer, white-tailed deer and elk populations will also benefit from the study.

Project Duration: Year 3 of 5

Partners: **Habitat Conservation Trust Fund; Local houndsmen; Washington Dept. of Fish & Wildlife**

SKATTEBO HABITAT ENHANCEMENT Project **#W00-NS-001**

Project Leader: Ross Clarke, Wildlife Biologist (Nelson)

Valley bottom habitat in the Castlegar-Nelson corridor has been heavily impacted by human activities including housing, roads and hydroelectric developments. Selkirk College's Department of Renewable Resources (DRR) was granted the 300-hectare Skattebo property near Glade from Crown lands. This is a low elevation and productive riparian ecosystem with high wildlife habitat values.

The Skattebo property presents an opportunity to conserve an important space at risk in an area where this habitat has been steadily disappearing, improve wildlife access to important riparian corridors along the Kootenay River and enhance critical low-elevation habitat.

The project involves two habitat enhancement treatments this year: thinning 10 ha of coniferous upland and riparian forest to improve spring and winter range for ungulates; and piling bucked slash to create habitat for small mammals. In addition, critical wildlife trees throughout the property are being identified, mapped and protected through signage.

The habitat enhancement work is being conducted by students from Selkirk College's Recreation, Fish & Wildlife, Integrated Environmental Planning and Forestry programs to give them hands-on habitat enhancement experience. The close proximity of the site to West Kootenay communities provides educational opportunities as a demonstration area for habitat enhancement techniques.

Duration: 1 Year

Partners: **Selkirk College**

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KOOTENAY LAKE

NORTHERN LEOPARD FROG RECOVERY PROJECT Project **#W00-M-010**

Project Leader: Doug Adama, Wildlife Biologist (Invermere)

Historically a common species and a favourite specimen in high school biology experiments, the ***red-listed Northern leopard frog*** has all but disappeared in British Columbia. In 1995, biologists located the only known population of Northern leopard frog in the Creston Valley Wildlife Management Area. Following this discovery, a three-year project was initiated to further investigate the status of this species in the Creston area and another two-year project, funded by the Columbia Basin Trust, to conduct surveys to determine if populations exist elsewhere in the Columbia Valley. These follow-up projects confirmed the absence of leopard frogs outside of the CVWMA site.

This recovery project is designed to expand the distribution of leopard frogs into historical East Kootenay breeding grounds to reduce the threat of extinction.

In the first year of this project, biologists will continue monitoring the CVWMA population and conduct egg mass surveys, gather information on summer habitat requirements, conduct a problem analysis related to reintroducing leopard frogs into unoccupied habitats and develop a recovery plan. Project findings will be presented at the Declining Amphibians Populations Canada meeting this fall.

Project Duration: Year 1 of 5

Partners: **Creston Valley Wildlife Management Area**

REVELSTOKE/BIG BEND

WOLVERINE REPRODUCTION & SURVIVAL Project **#W00-NM-015**

Project Leader: John Krebs, Senior CBFWCP Wildlife Biologist (Nelson)

Data from the six-year ***Wolverine*** Ecology & Habitat Use project suggest a probable decline of the ***blue-listed*** wolverine population in the 7,000 km (study area between Revelstoke and Roger's Pass. However, little information is known on two important variables associated with the rate of population decrease: subadult female survival rates and the age females begin reproducing.

Data on the reproductive ecology of female wolverines continue to be difficult to obtain because of insufficient sample size. Despite considerable capture and monitoring efforts in 1999, only one of nine radio-collared females was found to have successfully reproduced. In 1998, studies of juvenile wolverines found that only one of 10 radio-collared females produced young that survived post-den emergence and, to date, breeding females have been found only in roadless, undeveloped drainages. Biologists had established a target sample size of 10 kits for the project, but have been able to tag and monitor only 6 kits over six years.

Building on the current sample of females, this project will continue to gather critical reproductive and survival information including age at first reproduction, birth interval, den site selection, kit production and survivorship. With the assistance of a wildlife veterinarian, biologists will implant long-life transmitters to monitor female wolverines while ear-tagging and releasing newly captured males.

The objective is to develop progressive management and habitat preservation techniques to conserve wolverine populations for the long term.

Project Duration: Year 1 of 4

Partners: **Ministry of Forests; Canada Parks Service; Habitat Conservation Trust Fund; Columbia Basin Trust**

Bold and italic text – see Glossary for more information

COLUMBIA VALLEY

EAST KOOTENAY BADGER PROJECT Project **#W95-M-017**

Project Leader: Larry Ingham, CBFWCP Wildlife Biologist (Invermere)

The population of ***yellow badgers*** continues to decline in the East Kootenays and the species has recently been uplisted from ***blue-listed*** (vulnerable) to ***red-listed*** (endangered). This project has been extended one year to gather additional telemetry data, which will be used to validate a Habitat Suitability Model completed last year.

The project is examining the population status and habitat use of badgers in the headwaters of the Columbia River and recently extended south to Wardner.

Threats to badger populations include: loss of habitat (low elevation grassland, open forests) as a result of forest encroachment; reservoir creation; highway mortalities; residential developments; and predation.

Since the beginning of the project, 20 badgers have been radio-tagged. Over the course of the study, nine of these animals have died through predation, roadkill, old age and undetermined causes. In addition, four transmitters have failed. The remaining seven badgers are being monitored regularly.

Low trap success, predominantly adult captures, high mortality and low numbers of offspring of radio-tagged females indicate that badger populations are very low in East Kootenay, particularly north of Canal Flats.

Home range calculations to date show males and females in the East Kootenay occupying very large home ranges compared to previous badger studies in the US. The project will improve knowledge of badger habitat requirements and distribution, assess habitat enhancement potential for badgers and increase public awareness of badger/grassland association and conservation needs.

Project Duration: Year 6 of 5

Partners: **Forest Renewal BC; Canada Parks Service; Invermere Veterinary Hospital; East Kootenay Environmental Society**

ROBSON VALLEY

ROBSON VALLEY LAND STEWARDSHIP Project **#W97-M-002**

Project Leader: Larry Ingham, CBFWCP Wildlife Biologist (Invermere)

Much of the important wildlife habitat in the Robson Valley is on private land. In 1994, a plan was developed to involve landowners in a land stewardship program. A major recommendation of this plan was to identify rare and unique habitats and species before approaching every landowner. Recognizing that ***wetlands*** are under-represented on Crown lands in the Robson Valley, a follow-up project was initiated to identify the ten most desired wetland habitats on private lands in the Robson Valley area. The selection criteria included size, location, connectivity to existing Crown land and wildlife use.

Last year, CBFWCP biologists met with landowners and identified a range of enhancement and conservation opportunities. Potential projects include waterfowl nestbox and nesting platform placement, slashing deciduous habitats for ungulate enhancement, wetland protection and wetland creation.

Options being explored with landowners include: land-stewardship (landowners taking responsibility for conservation activities on their own lands), management agreements, leases, easements, covenants and land acquisition. As a result, 10 floating nest islands and a number of nest boxes have been constructed and installed to date.

This year, the biologists are continuing to identify additional habitats to pursue stewardship programs, meeting with private landowners and developing and implementing projects as they are identified.

Project Duration: Ongoing

Partners: **Robson Valley Landowners**

Bold and italic text – see Glossary for more information

EAST KOOTENAY ENHANCEMENT

Project **#W00-NL-018**

Project Leaders: John Krebs, Senior Wildlife Biologist (Nelson)
Larry Ingham, Wildlife Biologist (Invermere)
Doug Adama, Wildlife Biologist (Invermere)

Key wildlife habitats have been reduced in size and productivity in the East Kootenays as a result of fire suppression, invasive noxious weeds, construction of hydro-electric dams and rural development. These key habitats range from Rocky Mountain Trench grasslands and open forests (Natural Disturbance Type-4) to higher elevation forest stands (NDT-3). Reversing this trend of habitat loss requires the planning, coordination and implementation of broader-based and longer-term wildlife and ecosystem ***restoration*** projects.

This multi-year project is a roll-up of current habitat ***enhancement*** projects and outlines specific wildlife enhancement and ecosystem restoration planning, implementation and monitoring activities to be undertaken by the CBFWCP in 2000-2001.

One goal of this project is the restoration of grasslands and open forest habitats in the Rocky Mountain Trench. Over the last several decades, the encroachment of conifers into grasslands and open forests has resulted in an estimated loss of 3,000 hectares annually of these critical habitats in the East Kootenay Trench. The result has been the concentration of ungulates and domestic animals competing for food to the detriment of grassland habitats and native wildlife populations. The loss of these habitats is contributing to the decline of ***ungulate*** populations and to the ***extirpation*** of the blue-listed ***Sharp-tailed grouse***. In response, a number of agencies have been working with the Ministry of Forests to reverse these trends to the benefit of wildlife and other non-timber values.

The objectives of this project are to: simulate natural disturbance patterns to restore fire-maintained grassland and open forest habitats in the NDT-4 areas and maintaining key wildlife habitats in the NDT-3 areas; ***conserve***, enhance and/or re-establish native wildlife and plant species dependant on fire-maintained ecosystems; and participate in the planning and implementation of ecosystem restoration and wildlife enhancement project in NDT - 3 and NDT-4 regions. Planned activities for this project year include:

Project Development

Participation on East Kootenay Trench Restoration Committees;
Preparing a Stand Management Plan (SMP) and Burn Plan for priority sites within the Gold/Plumbob Range Unit;
Revising the Stoddart Creek Enhancement Plan;
Participating on the Radium Bighorn Sheep Working Group to coordinate activities between BC Environment, BC Forest Service, Kootenay National Park and CBFWCP;
Developing SMP and Burn Plans for other priority sites identified by the EK Trench Restoration Committees; and
Continuing work on reintroducing sharp-tailed grouse in the Rocky Mountain Trench.

Project Implementation

Undertake the following enhancement activities:
Reed Pasture prescribed burn;
Pre-burn slashing in the Gold/Plumbob Range Unit and East Buck Lake Pasture;
Pipeline Pasture prescribed burn;
Fontaine/Big Bull Pasture prescribed burn; and
Prescribed burn near Dry Creek in the Elk Valley.

Project Monitoring

Continue vegetation monitoring on Fontaine Pasture and establish pre-treatment plots on East Buck Lake;
Monitor enhancement treatments near Premier Ridge;
Map boundaries of enhancement sites; and
Input and summarize vegetation monitoring data.

Project Duration: Ongoing

Partners: **Rocky Mountain Elk Foundation; Rocky Mountain Natural Resource Society; Ministry of Forests; Habitat Conservation Trust Fund; Grazing Enhancement Fund; Local wildlife groups**

Bold and italic text – see Glossary for more information

R. M. BIGHORN SHEEP HABITAT & POPULATION ASSESSMENT Project **#W97-M-004**

Project Leader: Larry Ingham, Wildlife Biologist (Invermere)

This Rocky Mountain Trench project was initiated in 1995 to better understand the habitat and habitat conditions of bighorn sheep, and to improve range conditions and the populations of this ***blue-listed*** (vulnerable) species.

Project biologists have radio-collared and monitored approximately 30 sheep in three populations in the Columbia Lake, Wigwam/Mt. Broadwood and Bull River areas. Intensive monitoring continues until sheep return to summer ranges when the monitoring is replaced by weekly aerial tracking. Biologists are analyzing the habitat-use data to determine which habitats the sheep are selecting, and collecting pellets to assess diet composition and forage preference. Macroplots have been established for vegetation composition and measuring productivity as well as pellet collection.

This year, researchers are continuing ***telemetry*** efforts as well as conducting sampling and lab analysis for vegetation composition, vegetation productivity and forage quality. This project will: provide a better understanding of the habitats and habitat conditions of sheep; help determine the current carrying capacity of the habitat to support healthy bighorn sheep populations; identify existing enhancement opportunities; and improve range conditions. The overall result should be healthier populations of bighorn sheep.

Project Duration: Year 4 of 5

Partners: **Habitat Conservation Trust Fund; East Kootenay Wildlife Association; Foundation for North American Wild Sheep; Wild Sheep Society of BC**

TOWNSEND'S BIG-EARED BAT ROOST HIBERNACULUM CONSERVATION Project **#W97-M-009**

Project Leader: Larry Ingham, Wildlife Biologist (Invermere)

CBFWCP and partner agencies have made considerable progress in enhancing the security of identified maternity roosts of ***Townsend's big-eared bats*** in the Upper Kootenay area. This includes the roost of one of the largest known maternity colony of the ***blue-listed*** Townsend's big-eared bats in Canada on the St. Mary's Band Reserve near Cranbrook. Biologists also recognize that the availability and protection of suitable, secure hibernacula (hibernation roost) is critical to the long-term conservation of this species.

One significant hibernation site has been found in an old mine shaft. Unfortunately, the site is experiencing an increasing number of intrusions during the winter by a curious public, which may seriously impact the survival of the overwintering bats.

This project is designed to protect the hibernaculum by installing a structure to prevent human access while allowing the bats to pass freely. Biologists are also continuing their efforts to identify and conserve additional hibernacula to conserve this ecologically important and vulnerable bat species.

Project Duration: Year 1 of 1

Partners: **Ministry of Environment, Lands & Parks**

EAST KOOTENAY LYNX ECOLOGY & HABITAT SUITABILITY Project **#W97-M-108**

Project Leader: John Krebs, Senior Wildlife Biologist (Nelson)

The southern Canadian Rocky Mountains support a lynx population near the boundaries of the species' southwestern range. However, much of the lynx range in this East Kootenay wildlife management area is marginal habitat comprised of rock, ice and other inherently unsuitable habitat. In addition, this lynx range has been fragmented primarily by intensive forestry activities and, to a lesser degree, by other human activities such as highways. The Canadian lynx has been of regional conservation concern since the early 1980's when hunting/trapping trends indicated lynx populations were not recovering and may be declining in some areas.

A study completed by CBFWCP and partners in 1999 using radio-collaring and telemetry monitoring determined 18 lynx occupied the 3,500 sq. km^2 wildlife management area. The size of their home ranges was 250 km^2 for males and 107 km^2 for females. While adult survival rate was high, subadult (juveniles, kittens) survival was extremely low. Four of five subadults monitored during the winter did not survive to mid-May and three of four juveniles who dispersed to find their own ranges died of starvation. Monitoring of radio-collared female adults found that, although litters averaged 2 – 3 kittens, no kittens survived. Populations of snowshoe hares, the primary prey of lynx, appear to have crashed as well.

This project is primarily a radio telemetry-based field study to determine lynx habitat selection and suitability, movement patterns, inter-relationships of home ranges, food habits, denning ecology, reproduction, regional distribution and habitat capability, population status and association with snowshoe hare habitat.
Results from this study will lead to a more informed management of lynx populations and habitat and better integration with forestry planning and harvesting activities.
Project Duration: 5 of 5
Partners: **Parks Canada; Habitat Conservation Trust Fund; Columbia Basin Trust**

UPPER ELK VALLEY WINTER RANGE ENHANCEMENT Project **#W00-NM-013**
Project Leader: Larry Ingham, Wildlife Biologist (Invermere)
Improving range conditions and increasing the carrying capacity in limited high-elevation winter ranges in the Elk Valley area will help address the habitat needs for the ***blue-listed*** bighorn sheep.
Much of this Elk Valley high-elevation habitat has been impacted by industrial development and forest encroachment. The Elk Valley Bighorn Sheep Management Committee, comprised of local interest groups as well as all major coal and timber resource users in the area, was established from the CORE process to help address the needs of bighorn sheep in the Coal Enhanced Resource Development Zones. The committee recently agreed to develop ***enhancement*** plans for all bighorn sheep winter ranges in the zones. In addition, most of the timber and coal companies have agreed to fund enhancement activities within their designated areas of operation.
Several of these winter ranges fall outside these tenured or private property areas. This project is developing enhancement plans on three untenured winter ranges on Crown land.
Project Duration: 1 Year
Partners: **Elk Valley Bighorn Sheep Management Committee; Fording Coal Ltd.; Luscar Ltd.; Elkview Coal Corp.; Crestbrook Forest Industries; Sparwood Rod & Gun Club; Fernie Rod & Gun Club; Elkford Rod & Gun Club; Columbia Basin Trust; Ministry of Environment, Lands & Parks**

PICKERING HILLS ENHANCEMENT Project **#W00-NM-014**
Project Leader: Doug Adama, Wildlife Biologist (Invermere)
Pickering Hills, northwest of Jaffray, supports some of the largest wintering populations of elk, ***mule deer***, and white-tailed deer in BC and is also important for livestock grazing, hunting and various recreational uses. Habitat enhancement has been conducted on the area over time including ***riparian*** and waterfowl enhancements, ***prescribed burning*** and juvenile spacing. But noxious weeds have become a major problem throughout Pickering Hills.
CBFWCP completed a three-year project last year to inventory and control these noxious weeds. As well, an Ecosystem Restoration Plan was developed to assist in the implementation of the NDT-4 (natural disturbance type) guidelines of the Kootenay-Boundary Land Use Plan. This restoration plan identifies a schedule of treatment activities within Pickering Hills.
Prior to implementing restoration activities, weed control will continue for this year with a particular focus on ***knapweed***.
Anticipated benefits include improving grassland habitat for a variety of grassland-dependent wildlife species, facilitating the long-term control of noxious weeds and maintaining rangeland, habitat values and the biological diversity of Pickering Hills.
Project Duration: Year 1 of 10
Partners: **Rocky Mountain Natural Resources Society; Wildlife Groups; Grazing Enhancement Fund; Ministry of Agriculture, Food & Fisheries; Ministry of Forests**

BASIN WIDE

NON-GAME WILDLIFE ENHANCEMENT

Project **#W00-NL-019**

Project Leaders: John Krebs, Senior Wildlife Biologist (Nelson)
Larry Ingham, Wildlife Biologist (Invermere)
Doug Adama, Wildlife Biologist (Invermere)
Ross Clarke, Wildlife Biologist (Nelson)

CBFWCP has conducted a number of small-scale projects to benefit species affected by hydro-electric developments including the blue-listed ***painted turtles***, cavity-nesting ducks and the ***blue-listed*** Townsend's big-eared bats. Biologists, in partnership with local conservation groups, have created alternate nest sites for turtles, installed nest boxes to enhance cavity-nesting duck populations and constructed an innovative enclosure to protect the roost of the Townsend's Big-eared bats.

This project is coordinating the development, implementation, monitoring and maintenance of these enhancement projects. Specific activities include:

- monitoring and maintaining nestboxes in Columbia Valley and the Meadow Creek area;
- investigating turtle nest site enhancement opportunities at Erie Lake;
- controlling vegetation and monitoring the use of alternate nest sites created for turtles in Argenta Slough, Revelstoke's Williamson Lake and Cranbrook's Elizabeth Lake;
- monitoring and maintaining ***Townsend's big-eared bat*** maternity roosts near Cranbrook and liaising with First Nations and resort developers at the St. Eugene Mission.

This project is designed to conserve ecologically important and vulnerable bat species, improve the nesting success of cavity-nesting ducks, improve the viability of local painted turtle populations and increase wildlife viewing opportunities.

Project Duration: Ongoing

Partners: **Ktunaxa/Kinbasket Tribal Council; Rocky Mountain Naturalists; Golden & District Rod & Gun Club; Windermere Rod & Gun Club; City of Cranbrook; City of Revelstoke; Ministry of Transportation & Highways; North Arms Wildlife Club; Revelstoke Arrow Heights Elementary School; VSA Highways Maintenance; BC Hydro**

CBFWCP LAND MANAGEMENT

Project/Operation **#W95-L-009**

Project Leader: John Krebs, Senior Wildlife Biologist (Nelson)

Detailed habitat management plans direct enhancement activities on 2,400 hectares of land which CBFWCP manages in the Arrow, Pend d'Oreille and Kootenay Lake areas. These properties provide critical wildlife habitat for a wide range of species ranging from deer to bobolinks. Typically, the properties are low-elevation land with considerable ***ungulate*** winter range value. In 1998/99 CBFWCP finalized management plans for the Hamlin Creek properties near Nakusp, Marsden Face properties near Nelson and the ***Duncan/Lardeau properties*** at Meadow Creek. Last year, biologists completed a management plan for 200 ha of property near Deer Park.

The plans provide direction for future habitat-enhancement projects and allow CBFWCP staff to respond quickly to land management issues as they arise. The project encompasses important weed control efforts as well as specific enhancement projects captured in the West Kootenay Ungulate Enhancement Project.

Project Duration: Ongoing

Partners: **Habitat Conservation Trust Fund; Local Community Groups; The Nature Trust of BC**

Bold and italic text – see Glossary for more information

CBFWCP LAND ACQUISITION Project/Operation **#W95-L-021**

Project Leader: John Krebs, Senior Wildlife Biologist (Nelson)

One of the leading causes of declines in wildlife populations and, in many cases, to species becoming threatened or endangered, is loss of habitat. Land acquisition is an effective means to ensure key parcels of wildlife habitat are protected from non-compatible uses such as residential and industrial development.

The CBFWCP Land Acquisition Strategy prioritizes potential purchases based on availability, cost and ranking based on specific criteria including: habitat at risk; protecting critical habitat for species at risk; potential of a habitat to be enhanced and made more productive for affected species; proximity to other habitat reserves and to valuable habitats affected by hydroelectric developments; potential for partnerships to get the highest value for CBFWCP's land acquisition budget; and cost of ongoing management requirements to maintain and enhance the habitat.

This project is in consultation with MoELP Land Management to ensure co-ordination with other regional land acquisition initiatives. Habitat enhancements for acquired properties are conducted within CBFWCP Land Management plans (see CBFWCP Land Management above).

As well as protecting key wildlife habitats, benefits include fostering long-term commitment to wildlife conservation and habitat enhancement in the Columbia Basin region.

Project Duration: Ongoing

Partners: **Columbia Basin Trust; The Land Conservancy; BC Conservation Foundation; Rocky Mountain Elk Foundation; The Nature Trust of BC**

CONSERVATION OF DECIDUOUS FORESTS Project **#W00-NM-012**

Project Leader: John Krebs, Senior Wildlife Biologist (Nelson)

Decidious forests (cottonwood, birch, aspen) are known to support a high abundance and diversity of wildlife. Flooding from hydroelectric reservoirs eliminated significant stands of deciduous forests within the Columbia Basin. Remaining stands may be at risk from other more subtle threats such as alteration of natural disturbance patterns by fire suppression, intensive forest management and lack of periodic flooding. These threats are affecting the current and future distribution of these forests.

Biologists will assess these risks through a combination of mapping and literature review to suggest conservation/restoration strategies for the maintenance of these important forest stand types.

Project Duration: Year 1 of 3

Partners: **Ministry of Environment, Lands & Parks**

LARGE MAMMAL MONITORING Project **#W95-L-012**

Project Leaders: Larry Ingham, Wildlife Biologist (Invermere)
John Gwilliam, Wildlife Biologist (Nelson)

The basin-wide Large Mammal Monitoring Plan is designed to help identify habitat areas of high-use by large mammals to assist in long-term plan development, assist in evaluating the success of enhancement and protection activities, and track large mammal population trends to help manage problems before they become serious.

Activities planned for this year include: complete absolute abundance surveys for mountain goats in selected areas within the East and West Kootenays; conduct carry-over counts for deer in the East Kootenay; undertake night counts in the Pend d'Oreille; and monitor survivorship of radio-collared white-tailed deer in the West Kootenay. Transects are counted at least four times each spring and the data collected is entered into the provincial Ungulate Inventory Database.

The data will be used to estimate pre-enhancement populations, assist in developing detailed enhancement projects and to track the status of ***ungulate*** species.

Project Duration: Ongoing

Partners: **East Kootenay Wildlife Association; Canal Flats Wilderness Club; Kimberley Wildlife & Wilderness Club: Fernie Rod & Gun Club; Lake Windermere Rod & Gun Club; Traditional Bow Hunters of BC; Sparwood & District Fish & Wildlife Club; Ministry of Environment, Lands & Parks**

Bold and italic text – see Glossary for more information

COLUMBIA BASIN BIODIVERSITY ATLAS Project **#W00-NS-011**

Project Leaders: Ian Parfitt, GIS Co-ordinator (Nelson)
Doug Adama, Wildlife Biologist (Invermere)

The Columbia Basin is one of the most diverse regions in British Columbia. The area is renowned for its populations of large mammals, songbirds, rare plants and rare ecosystems, and is home to important populations of many vulnerable and endangered species including grizzly bears, Rocky Mountain bighorn sheep, badgers, Townsend's big-eared bats, northern leopard frogs and Lewis woodpeckers.

The Columbia Basin is also a region experiencing increasing pressure from economic growth. Human population and development is expected to increase dramatically over the next few decades. Such an influx will also increase the magnitude of negative consequences to wildlife and wildlife habitat. For example, one of the greatest challenges in the East Kootenays will be maintaining sufficient wildlife habitat to ***sustain*** the natural biodiversity in the Rocky Mountain Trench.

A recent approach in maintaining biodiversity has emerged through a combination of habitat mapping, inventory and conservation biology. However, exisiting species populations and ecosystem information is rarely synthesized and often hard to access.

This project is developing a work plan for a Biodiversity Atlas for the Columbia Basin. Benefits can include: conserving listed and important species and habitats; providing an educational tool to inform the public on species and habitat requirements; describing habitat enhancement opportunities to involve the public (examples are bat houses, nest boxes, landowner stewardship programs); outlining both current and required conservation initiatives; and providing resource managers with an integrated tool for resource management.

Project Duration: 1 Year

SMALL WILDLIFE PROJECT Project **#95-L-013**

Project Leader: John Krebs, Senior Wildlife Biologist (Nelson)

Providing opportunities for public involvement in meaningful projects to ***enhance*** wildlife populations in the Columbia Basin is a cornerstone of the Compensation Program. This task is designed to encourage interested local community clubs and organizations to approach the program for technical and limited financial assistance in locally-initiated projects within the project year. Projects in the past have included: construction and placement of nestboxes; caribou/snowmobile conflict sign and pamphlet; fertilizing in the Buck Lake area to reduce grazing pressure on private land; and slashing decadent shrubs in mule deer winter range near New Denver.

The funding available for each community-initiated wildlife project in this Small Works Project is up to $10,000 per project.

Project Duration: Ongoing

Partners: **Various community groups**

Small wildlife projects planned for this year include:

KIMBERLEY AIRPORT SLOUGH

Cattle usage of the Airport Slough near Kimberley is degrading the habitat for resident wildlife and affecting vegetation important to the health of this riparian ***wetland***. This one-year project, initiated by the Kimberley Wildlife & Wilderness Club, involves constructing a fence surrounding the ***riparian*** area while still allowing for public access on foot. The fence will exclude cattle and allow for the rejuvenation of rushes and other vegetation utilized by waterfowl and other shore birds as nesting areas.

Project Duration: 1 Year

Partners: **Kimberley Wildlife & Wilderness Club**

Bold and italic text – see Glossary for more information

Evolution of CBFWCP

Evolution of Columbia Basin Fish & Wildlife Compensation Program

Hydroelectric development by BC Hydro in the Columbia Basin occurred between 1960 and 1985. Some of the potential dam impacts were immediately evident, such as the Seven Mile Dam development flooding prime white-tailed deer habitat in the Pend d'Oreille Valley. Other impacts, such as decline in lake productivity, were gradual and took up to a 20-25 year period before becoming evident.

The Columbia Basin Fish & Wildlife Compensation Program is a joint initiative separate from—but not independent of - the BC Hydro and BC Government (Ministry of Environment, Lands & Parks, BC Fisheries) partners. CBFWCP was created in 1994, evolving from existing Mica, Revelstoke and Pend d'Oreille compensation programs as well as related activities in the Arrow and Duncan reservoir areas. The new Compensation Program formed a more comprehensive and integrated program for the BC portion of the Columbia River Basin.

CBFWCP's mandate is to deliver projects to conserve and enhance fish and wildlife populations affected by BC Hydro dam-related activities throughout the Columbia Basin. CBFWCP receives $3.2 million a year from a perpetual fund established by BC Hydro as part of the crown corporation's water license agreement.The annual allocation of these funds for fish and wildlife projects is established through a three-tiered process:

- project applications are submitted by organizations and community groups;
- Program biologists and respective Fish or Wildlife Technical Committees evaluate proposed projects based on established Acceptability and Ranking Criteria; and
- the technically-approved projects are reviewed and receive financial approval from the CBFWCP Steering Committee.

The Steering Committee, which also approves CBFWCP's Annual Operating Plan, is comprised of representatives from BC Hydro, BC Environment and BC Fisheries as well as public representatives for each of three areas (southeast Kootenays, southwest Kootenays, northern Kootenays) and First Nations.

A key component of CBFWCP's mandate is Public Consultation and Communications to build support and involvement in the Program among residents, community groups and other key stakeholders including First Nations, local governments, resource users, government agencies and the media.

1994	CBFWCP created
1995/96	CBFWCP begins operations, jump-started by projects underway from previous compensation programs and activities.
1996/97	77 fish & wildlife projects with 30 partners
1997/98	70 fish and wildlife projects with 50 partners 16 projects involving species at risk
1998/99	90 fish and wildlife projects with 90 partners (43 local community groups) 23 projects involving species at risk
1999/2000	44 fish and wildlife projects with 46 partners 15 projects involving species at risk
2000/2001	59 fish & wildlife projects with 123 partners 16 projects involving species at risk

Approved Projects 1999/2000

● WILDLIFE PROGRAM

Map# Project

Arrow
1 West Kootenay Ungulate Enhancement Project
2 West Kootenay Mule Deer Project
3 Salmo River Harlequin Duck Inventory
4 South Selkirk Cougar Ecology & Predation Study
5 Skattebo Habitat Enhancement

Kootenay Lake
6 Northern Leopard Frog Recovery Project

Revelstoke/Big Bend
7 Wolverine Reproduction & Survival Project

Columbia Valley
8 East Kootenay Badger Project

Robson Valley
9 Robson Valley Land Stewardship

Upper Kootenay
10 East Kootenay Enhancement
11 Rocky Mountain Bighorn Sheep Habitat & Population Assessment
12 Townsend's Big-eared Bat Roost Hibernaculum Conservation
13 East Kootenay Lynx Ecology & Habitat Suitability
14 Upper Elk Valley Winter Range Enhancement
15 Pickering Hills Enhancement

Basin-wide
Non-Game Wildlife Enhancement
CBFWCP Land Management
CBFWCP Land Acquisition
Conservation of Deciduous Forests
Columbia Basin Biodiversity Atlas
Large Mammal Monitoring
Small Works Project

Small Works Wildlife Projects
16 Kimberley Airport Slough

♦ FISH PROGRAM

Arrow Lakes Reservoir
1 Hill Creek Hatchery & Spawning Channel Operations
2 Arrow Lakes Reservoir Fertilization & Monitoring
3 Arrow Lakes Reservoir Trout Radio Telemetry
4 Arrow/Kinbasket Rainbow Trout Stock ID & Distribution

Upper Columbia
5 Upper Columbia Burbot
6 Upper Columbia Kokanee Spawner Survey

Upper Kootenay
7 Upper Kootenay Bull Trout Telemetry Project
8 Koocanusa Kokanee Survey

Kootenay Lake
9 Meadow Creek Spawning Channel Operations
10 Kootenay Lake Fertilization & Monitoring Project

Basin-wide
Project Development/Small Works Project

Small Works Fisheries Projects
Upper Arrow
11 Illecillewaet River Watershed Atlas
12 Tonkawatla River Fish Distribution & Habitat Assessment
13 Martha Creek Habitat Creation
14 Lake Revelstoke Creel & Visitor Survey Use
15 Camp Creek Kokanee Spawner Survey
16 Lake Revelstoke Winter Creel Survey

Lower Columbia & Kootenay Drainage
17 Murphy Creek Side Channel Spawner Counts & Intake Monitoring
18 Blueberry Creek Barrier Evaluation & Mitigation
19 Sproule Creek Culvert Passage & Rehabilitation

Upper Columbia
20 Sinclair Creek Rehabilitation Project

NOTES

Fish & Wildlife Project Map

Fish and Habitat Enhancement Project Partners:

BC Fisheries
BC Hydro
BC Hydro Youth 2000
BC Parks
Blueberry Creek Irrigation District
Bonneville Power Administration
Canada Parks Service
CBFWCP Revelstoke Public Advisory Committee
CBFWCP Valemount Public Advisory Committee
Columbia Basin Trust
Columbia Mountains Institute of Applied Ecology
Columbia Power Corporation
Columbia-Kootenay Fisheries Renewal Partnership
CP Rail
Ecoaction 2000
Fisheries Renewal BC
Habitat Conservation Trust Fund
Human Resources Development Canada
Ministry of Environment, Lands & Parks
Ministry of Transportation & Highways
Montana Dept. of Fish, Wildlife & Parks
Nelson District Rod & Gun Club
Revelstoke Rotary Club
Selkirk College
Trail Wildlife Association
University of British Columbia
Village of Radium Hot Springs
Village of Valemount

Wildlife and Habitat Enhancement Project Partners:

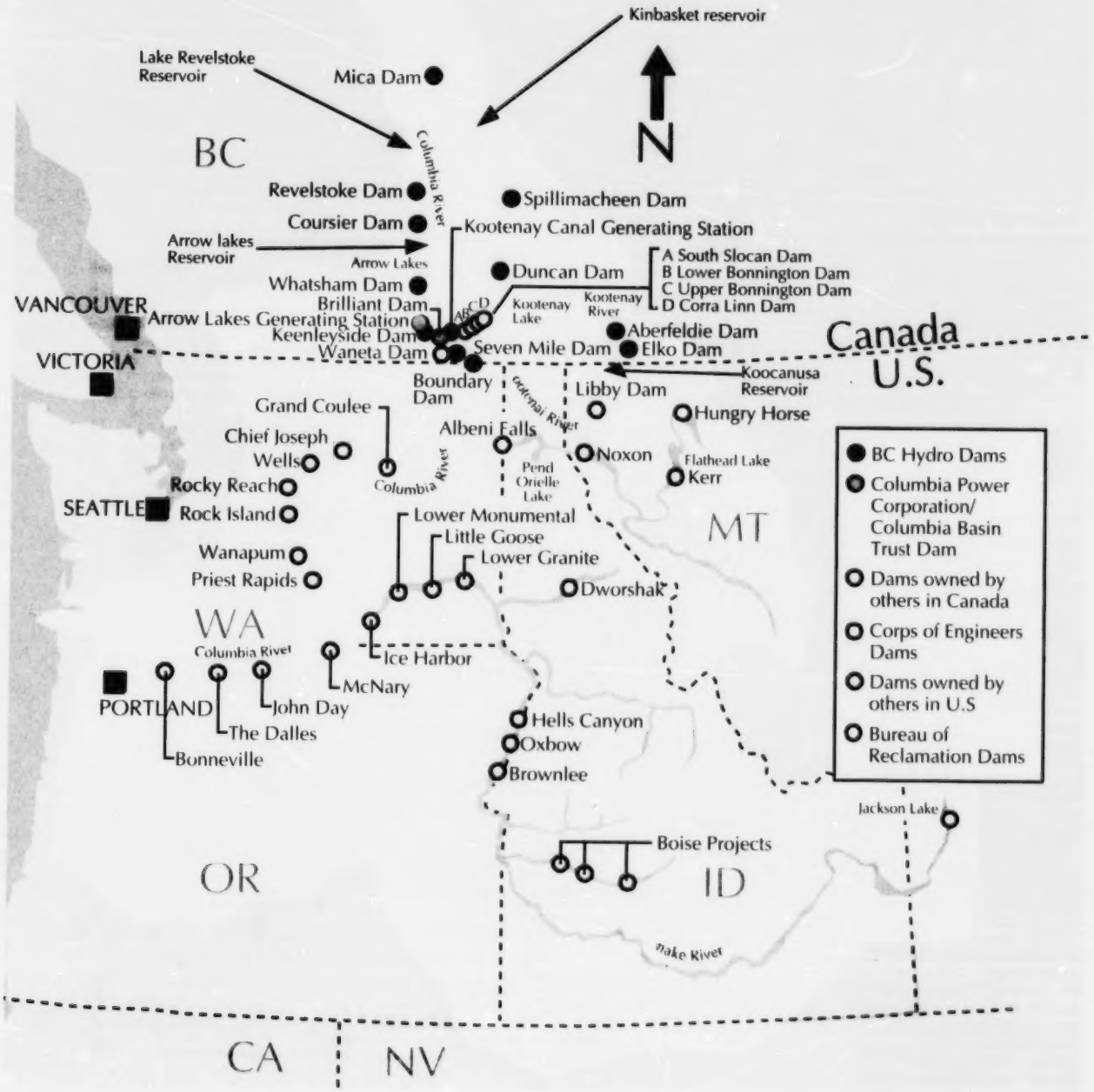
BC Conservation Foundation
BC Fisheries
BC Hydro
Canada Parks Service
Canal Flats Wilderness Club
City of Cranbrook
City of Revelstoke
Columbia Basin Trust
Crestbrook Forest Industries
Creston Valley Wildlife Management Area
East Kootenay Environmental Society
East Kootenay Wildlife Association
Elk Valley Bighorn Sheep Management Committee
Elkford Rod & Gun Club
Elkview Coal Corp.
Fernie Rod & Gun Club
Fording Coal Ltd.
Forest Renewal BC
Foundation for North American Sheep
Golden District Rod & Gun Club
Grazing Enhancement Fund
Habitat Conservation Trust Fund
Invermere Veterinary Hospital
Kimberley Wildlife & Wilderness Club
Ktunaxa Kinbasket Tribal Council
Local Houndsmen
Luscar Ltd.
Malcolm Dennington (local volunteer)
Ministry of Agriculture, Food & Fisheries
Ministry of Environment, Lands & Parks
Ministry of Forests
Ministry of Forests, Small Business Division
Ministry of Transportation & Highways
North Arm Wildlife Club
Revelstoke Arrow Heights Elementary School
Robson Valley Landowners
Rocky Mountain Elk Foundation
Rocky Mountain Natural Resources Society
Rocky Mountain Naturalists
Salmo Watershed Streamkeepers Society
Selkirk College
Sparwood District Fish & Wildlife Club
Sparwood Rod & Gun Club
The Land Conservancy
The Nature Trust of BC
Traditional Bowhunters of BC
VSA Highways Maintenance
Washington Dept. of Fish & Wildlife
Washington State University
Wild Sheep Society of BC
Windermere Rod & Gun Club

Production Date: October 12, 2000 - Projection: UTM Zone 11

BC hydro

British Columbia

Columbia River Drainage System



ARROW LAKES RESERVOIR AND KOOTENAY LAKE

Geographic

Columbia Basin	87,250 km2	(8.7% of BC; over 2x size of Vancouver Island)	
Arrow Lakes Reservoir	507 km2	190 km long	52,600 hectares
Kootenay Lake	405 km2	107 km long	45,187 hectares

1934 Grand Coulee Dam is constructed in Washington State to control floods and produce electricity. Stops anadromous runs of sockeye and chinook salmon and steelhead trout in the Columbia Basin, primarily in Arrow Lakes and Upper Columbia River near Invermere.

1948 Spring floods devastate houses, businesses and communities along the Columbia River in Canada and the US claiming 41 lives, leaving 38,000 people homeless. A US/Canada International Joint Commission begins study of the basin for possible sites for flood control storage projects. The Commission identified areas of storage within Canada to control future flooding situations.

1949 Mysid shrimp is introduced in Kootenay Lake as a food source for intermediate-sized rainbow trout.

1953 Cominco phosphate fertilizer plant on Kootenay River is operational and causes a significant decline in water quality and an increase in nutrient levels in Kootenay Lake.

1961 Canadian and US governments sign Columbia River Treaty, requiring Canada to build large dams and storage reservoirs now called: Mica, Keenleyside and Duncan. Canadian government transfers the Canadian portion of the treaty to BC Government. US is allowed to build Libby Dam in Montana and flood land upstream in Canada (Koocanusa Reservoir).

1962 BC Government creates BC Hydro as the "Columbia River Treaty Entity" responsible for building and operating dams and reservoirs for flood control and power production.

1964 Columbia River Treaty is ratified with BC Government allowed to sell a 50% share of downstream benefits for 30 years to build Columbia River Treaty dams and reservoirs.

1967 Duncan Dam is constructed above Kootenay Lake and creates a 7,145 hectare Duncan Lake reservoir.

1968 Fisheries managers introduce Mysid shrimp into Arrow Lakes Reservoir as a food source for young fish-eating trout.

1969 Keenleyside Dam is constructed, flooding the two lakes to create one reservoir of water and eliminating an estimated 30% of spawning/rearing habitat.

1972 Libby Dam is constructed, affecting both fish and wildlife habitat. Nutrient retention in Kootenay Lake (phosphorus loading) declines to one-third of historical levels following pollution control measures at Cominco's fertilizer plant.

1973 Cominco fertilizer plant on Kootenay River shuts down.

1976 Mica Dam is constructed and begins operations with a further impact on fishing stocks. Seven Mile Dam is constructed on Pend d'Oreille River, impacting ungulate habitat. Mica and Pend d'Oreille compensation programs are created by BC Hydro to compensate for fish and wildlife impacts by the dams.

1977 Number of spawning kokanee returning to spawn in North Arm of Kootenay Lake is estimated at 1.4 million.

1980 Hill Creek Spawning Channel is completed by BC Hydro to compensate for impact of Keenleyside Dam on fish populations. The channel is 3.2 km long, 6.1 km wide with 56 settling-basin holding areas for spawners and a capacity for 150,000 kokanee salmon.

1982 Hill Creek Hatchery is completed by BC Hydro to replace anticipated loss of Arrow Lakes fish spawning capacity as a result of Revelstoke Dam.

1984 Revelstoke Dam is constructed, flooding 150 km of mainstem Columbia River and 200 km of tributaries, and significantly impacting fish stocks and habitat over a 11,560 hectare area. Cumulative impact of dams was the estimated loss of 66% of the bull trout population.

1987 Hill Creek Hatchery size is doubled to produce Arrow Lakes fish lost as a result of the Keenleyside Dam. Capacity is 100,000 fingerling bull trout, 20,000 yearling rainbow trout, 60,000 yearling Gerrard rainbow trout and up to 2 million kokanee eggs per year.

1990 Kootenay Lake South Arm kokanee stocks are virtually extinct. BC Environment, Kootenay Region Fisheries holds public meetings to explore restoration options.

1991 Kootenay Lake North Arm spawning kokanee escapement declines to 237,000.

1992 BC Environment and BC Hydro begins 5-year experimental fertilization project in North Arm.

1994/95 CBFWCP is created which consolidates all previous compensation programs. The Program begins delivering projects to sustain and enhance fish and wildlife populations affected by BC Hydro dam-related activities in the Columbia Basin. Funding is $3.2 million in perpetuity from BC Hydro as a part of the crown corporation's water licence agreement.

1996 CBFWCP begins accelerated projects to measure the effect of the dams on nutrient levels and fish populations in the Arrow Lakes Reservoir.

1996/97 Water levels similar to 1948 occurs along the Columbia River, but flood control from dams reduces natural flows 40% and minimizes impact. No lives or dwellings are lost.

1997 Kootenay Lake North Arm spawning escapement increases to 1.45 million. Amount of fertilizer (agricultural-grade nitrogen & phosphorus mix) is reduced after ongoing monitoring indicates the lake is beginning to retain nutrients from previous fertilizations.

1998 North Arm spawning escapement increases to 2.15 million; total kokanee population in the Kootenay Lake reaches 25-30 million; kokanee-feeding bull trout and rainbow trout caught by anglers nearing 13.6 kg (30 lb). The number of Gerrard rainbow trout spawners increases to historical levels.

1998 Kootenay Lake experimental fertilization project results and proposed restoration plan for Arrow Reservoir are presented at 2-day Public Conference in Nelson.

1999 Upper Arrow Lakes Reservoir fertilization from the Galena-Shelter Bay ferry begins in late April.

2000 Arrow Lakes Reservoir Fertilization Project results after first year indicate algae production has increased 2 1/2 times.

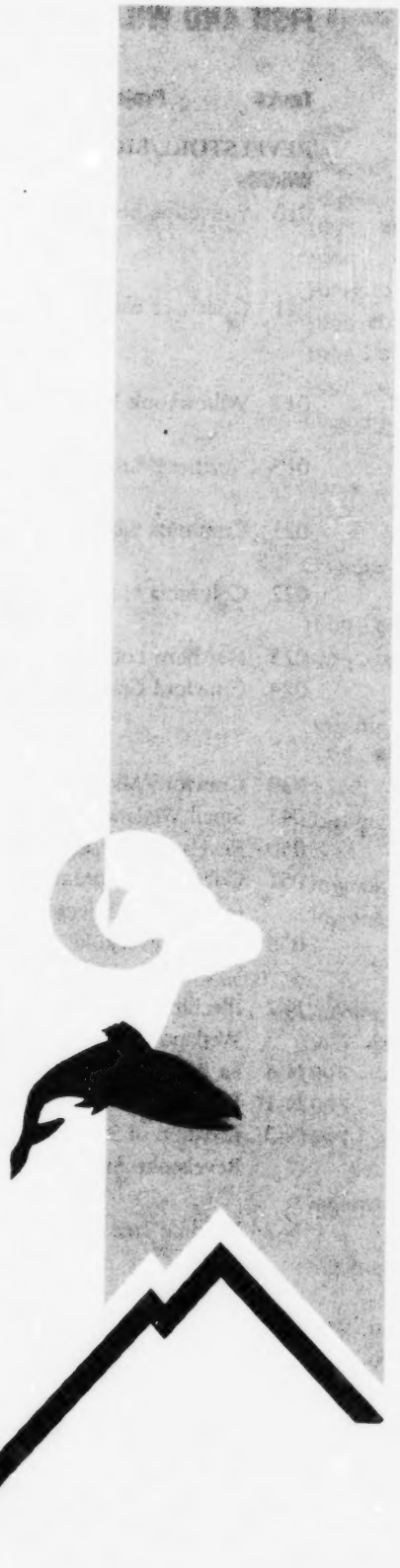
CBFWCP
Fish & Wildlife Projects
1995 – 2000

ACCOMPLISHMENTS TO DATE

(not including 2000/2001 fish and wildlife projects)

Columbia Basin

FISH & WILDLIFE
Compensation
Program



www.cbfishwildlife.org

BC hydro

British Columbia

FISH AND WILDLIFE PROJECTS 1995 - 2000

Task#	Project	Partners	Status
REVELSTOKE/BIG BEND			
Wildlife			
010	Wolverine Ecology & Habitat Use	Ministry of Forests, Habitat Conservation Trust Fund, Canada Parks Service	1995 - 2000
011	Grizzly & Black Bear Monitoring	Friends of Mt. Revelstoke & Glacier, Canada Parks Service, BC Forest Service	1994 - 99
012	Willowbank Mountain Enhancement	Ministry of Forests, Golden Rod & Gun Club	Ongoing
015	Northern Long-Eared Bat	University of Calgary, Canada Parks Service	1995 - 98
021	Cummins Bio-Terrain Ecosystem Mapping	Ministry of Forests	1996 - 99
022	Columbia Mountain Caribou Research	Canada Parks Service, Ministry of Forests	1995 - 99
023	Northern Long-Eared Bat Species Status		1995 - 96
024	Crawford Creek/Arrowhead Enhancements	Revelstoke Rod & Gun Club BC Hydro	Ongoing
039	Crawford/Alkololex Enhancement		1996 - 98
043	Small Wetland Enhancement		Ongoing
050	Revelstoke Wetland Project Development		1996 - 97
051	Columbia Mountain Institute of Applied Ecology	Ministry of Forests, Canada Parks Service	1996 - 98
058	Arrow/Revelstoke Raptor Survey	BC Forest Service Forest industry	1996 - 97
N-2	Illecillewaet Greenbelt Nature Park Wetland Rehabilitation Survey	Illecillewaet Greenbelt Society	1997 - 98
N-4	La Forme Creek Girdling		1997 - 98
N-16	Bear-Human Conflict Education	Friends of Mt. Revelstoke & Glacier	1996 - 99
N-32	Location of Suspected Bat Hibernaculum Revelstoke Area	Revelstoke Advisory Committee Funding by Columbia Basin Trust	1998 - 99
N-34	Wildlife Tree Creation & Enhancement	Revelstoke Advisory Committee Funding by Columbia Basin Trust	1998 - 99

Task#	Project	Partners	Status
ROBSON VALLEY			
Wildlife			
013	Deer Habitat Utilization		1995 - 96
015	Mountain Caribou in Robson Valley		Ongoing
017	Deer Habitat Use Monitoring		Ongoing
020	McBride Peak Enhancement		1995 - 96
021	Raush Valley Enhancement		1995 - 96
047	Holmes River Enhancement		1996 - 97
048	Nevin Creek Enhancement		1996 - 97
049	Tete Jaune Bioterrain & Ecosystem Mapping		1996 - 97
052	Fisher Population Status		1996 - 97
N-7	Robson Valley Land Stewardship	Robson Valley Landowners	Ongoing
ARROW LAKES VALLEY			
Wildlife			
001	Pend d'Oreille/South Salmo Enhancement	Trail Wildlife Association, Habitat Conservation Trust Fund	Ongoing
002	Wilson/Stagleap Biophysical Mapping		1995 - 96
003	Pend d'Oreille Bat Survey	Ministry of Forests	1995 - 96
004	Arrow Lakes Land Management		Ongoing
005	Forest Interior Conditions- McCormick Creek	Ministry of Forests	1995 - 96
006	Arrow Lakes Large Mammal Monitoring (Arrow Lakes Compensation Program)	Trail Wildlife Association Castlegar & District Wildlife Association	Ongoing
007	Pend d'Oreille Large Mammal Monitoring		Ongoing
008	Nakusp Caribou	Habitat Conservation Trust Fund, Ministry of Forests, Industry (Pope & Talbot, Slocan Forests Products)	Ongoing
009	Arrow Lakes Reservoir Forage Enhancement	Selkirk College	Ongoing
015	Pend d'Oreille Valley Habitat Enhancement		1995 - 96
016	Arrow Lakes Enhancement Area Identification		1995 - 96
018	Pend d'Oreille Deer/Predator Relationships		1995 - 96
019	Amphibian & Reptile Inventory (Pend d'Oreille Compensation Program)		1995 - 96
025 & 040	Fort Sheppard Bioterrain Ecosystem Mapping	Trail Wildlife Association, Cominco	Ongoing
029	West Kootenay Mule Deer Study	Washington State University, Ministry of Forests	Ongoing
032	Arrow Lakes Land Management		1995 - 96
035	Bat Survey Species & Habitat Inventory		1994 - 95
041	Arrow Lakes Enhancement		Ongoing
043	Small Wetlands Enhancement	Selkirk College, City of Castlegar	Ongoing
054	West Kootenay Mule Deer		1996 - 97
N-8	Pend d'Oreille California Bats Study	York University	1997 - 98
N-17	Ceanothus Planting	Traditional Bow Hunters of BC Trail Wildlife Association, BC Hydro, Funding by Columbia Basin Trust	1998 - 99

Task#	Project	Partners	Status
ARROW LAKES RESERVOIR			
Fish Projects			
001	Hill Creek Hatchery & Spawning Channel Operations		Ongoing
010	Arrow Lakes Reservoir Kokanee Stock Assessment		Ongoing
012	Arrow Lakes Reservoir Paleolimnology	University of British Columbia	1997 - 98
013	Arrow Lakes Reservoir Bull Trout Life History	University of British Columbia	Ongoing
015	Arrow Lakes Reservoir Bull Trout Genetics/Stock Identification	University of British Columbia	Ongoing
016	Arrow Lakes Reservoir Rainbow Trout Hatchery		1995 - 96
024	Hill Creek Hatchery and Spawning Channel		Ongoing
038	Lower Arrow Lakes Reservoir Tributary Inventory		1996 - 97
N-22	Arrow Lakes Reservoir Water/Nutrient Exchange	University of British Columbia	1998 - 99
N-23	Arrow Lakes Reservoir Nutrient Recycling	University of British Columbia Institute of Ocean Sciences	1998 - 99
N-24	Arrow Lakes Reservoir Productivity Study	University of British Columbia	1998 - 99
N-25	Arrow Lakes Reservoir Fish Summary		Ongoing
N-34	Tonkawatla River Rainbow Trout Habitat Enhancement	Revelstoke Advisory Committee Local landowners	Ongoing
N-36	Fissure Creek Diversion Feasibility Study	Revelstoke Advisory Committee Funding by Columbia Basin Trust	1998 - 99
N-39	Arrow Lakes Reservoir Rainbow Trout Stock Identification & Distribution	Revelstoke Fly Fishers Society University of British Columbia, Funding by Columbia Basin Trust	1998 - 99
N-40	Illecillewaet River Assessment	Local community groups, Canada Parks Service	1998 - 99
N-41	Arrow Lakes Reservoir Trout Radio Telemetry	Revelstoke Advisory Committee Funding by Columbia Basin Trust	Ongoing
N-43	Burton Creek Fish Habitat Assessment	Local community groups	Ongoing
N-60	Birch Creek Plunge Pool Repair	Revelstoke Rod & Gun Club, Funding by Columbia Basin Trust	1998 - 99
NL-019	Arrow Lakes Reservoir Fertilization and Monitoring	Ministry of Transportation and Highways, Revelstoke Marine Branch Columbia Power Corporation Columbia Basin Trust	Ongoing

Task#	Project	Partners	Status
COLUMBIA VALLEY			
Wildlife Projects			
004	Elk Habitat Use	Windermere Rod and Gun Club, Southern BC Guides and Outfitters, Rocky Mountain Elk Foundation	1995 - 96
005	Frenchman's Ridge Enhancement	Golden & District Rod & Gun Club	1994 - 97
013	East Kootenay Badger	Invermere Veterinary Hospital Canada Parks Service, Forest Renewal BC	Ongoing
014	Nestbox Monitoring	Invermere Rod & Gun Club Golden & District Rod & Gun Club	Ongoing
019	North Stoddart Creek Enhancement	Ministry of Agriculture & Food Ministry of Forests	Ongoing
024	Avalanche Path Habitat Study	Ministry of Forests	Ongoing
029	Cottonwood Habitat Inventory		1995 - 96
030	Painted Turtle Protection Project	Rocky Mountain Naturalists City of Cranbrook	Ongoing
N-11	Rocky Mountain Bighorn Sheep Habitat & Population Assessment	East Kootenay Wildlife Association	Ongoing
N-15	East Kootenay Lynx Ecology & Habitat Study	Canada Parks Service, Habitat Conservation Trust Fund, Funding by Columbia Basin Trust	1998 - 99
N-55	East Kootenay Ground Squirrel Survey	East Kootenay Environmental Society Columbia Valley Field Naturalists, Funding by Columbia Basin Trust	1998 - 99
UPPER COLUMBIA			
Fish Projects			
001a	Bull Trout Radio Telemetry	BC Hydro	Ongoing
010	Kinbasket Reservoir Kokanee Spawner Survey	Ktunaxa-Kinbasket Tribal Council	Ongoing
012	Angler Log Book Program	Local Anglers	Ongoing
013	Akolkolex River Habitat Improvement	Watershed Restoration Program	Ongoing
017	Kinbasket/Revelstoke Reservoir Kokanee Spawning Survey	Valemount Advisory Committee, Funding by Columbia Basin Trust	1998 - 99
017	TumTum Creek/Grassy Lake Habitat Improvement		1995 - 96
019	Succour Arm Small Lake Development		1995 - 96
019	Upper Columbia Burbot Biology	University of British Columbia	Ongoing
021	Goldstream Creek Culvert Improvements	Ministry of Transportation & Hwys	Ongoing
028	Upper Jordan River Habitat Improvement		Ongoing
029	Kinbasket Kokanee Spawner Counts		1995 - 96
030	Dutch Creek Habitat Rehabilitation Planning		1995 - 96
031	Twin Bridge Creek Bull Trout Habitat Requirements		1995
034	Maclean Lake Outlet Spawning Platform Installation		1995
038	Canoe Reach Alpine Lake Inventory	Valemount Advisory Committee, Funding by Columbia Basin Trust	1998 - 99
039	Kinbasket Kokanee Fishery Survey		1995

Task#	Project	Partners	Status
040	Kinbasket Lake Spring Creel Survey		1995
048	Hugh Allen Creek Inventory & Bull Trout Assessment		1995
051	Birch Creek Enhancement		Ongoing
052	Revelstoke Reservoir Tributary Fish Habitat Assessment		1995
055	Camp Creek Flow Investigations		1995
058	Twin Lakes Cutthroat Habitat Improvement		1995
065	Revelstoke Reservoir Culvert/Fish Passage Improvement		1995
066	Goldstream Creek Fish Access Improvement		1995
N-28	Camp Creek Habitat Enhancement Evaluation	Valemount Advisory Committee,	1997 - 99

LOWER COLUMBIA

Fish Projects

N-31	Lower Columbia/Murphy Creek Rainbow Trout Studies	Trail Wildlife Association, West Kootenay Fly Fishers, BC Hydro RL&L Environmental Services	1998 - 99
045	Murphy Creek Side Channel Repairs	Trail Wildlife Association Columbia Power Corporation	1998 - 99
055	Norns Creek Spawning/Rearing Habitat Enhancement	Castlegar & District Wildlife Association	1998 - 99
061	Salmo River Inventory & Fish Population Assessment		1995
062	Deer Creek Remediation Plan Enhancement	Castlegar & District Wildlife Association, Funding by Columbia Basin Trust	1998 - 99
063	Taite Creek Remediation Plan Enhancement	Castlegar & District Wildlife Association, Funding by Columbia Basin Trust	1998 - 99
066	Blueberry Creek Remediation Plan	Trail Wildlife Association, West Kootenay Fly Fishers, Forest Renewal BC, Columbia Power Corporation Ministry of Transportation & Hwys Funding by Columbia Basin Trust	1998 - 99
071	Lower Columbia Tributary Fish Flow Requirements		1995 - 96
F-13	Little Slocan River Landslide Rehabilitation	Slocan Valley Equal Access to Public Resources Society Timberland Consultants, Funding by Columbia Basin Trust	1998 - 99

Task #	Project	Partners	Status
KOOTENAY LAKE			
Wildlife Projects			
	Kupei Wetland Habitat Enhancement	Lower Kutenai Band, Ducks Unlimited	1995 - 96
020	Small Mammal Status	Royal BC Museum	Ongoing
022	Enhancement Area Identification		Ongoing
023	Kootenay Lake Purple Loosestrife		1997 - 98
053	Duncan Lardeau Enhancement	Appropriate Forestry	Ongoing
N-3	Northern Leopard Frog Status Survey	Creston Valley Wildlife Mgmt. Area	Ongoing
N-5	Wetland Habitat Enhancement	Creston Valley Wildlife Mgmt. Area	1998 - 99
N-30	Habitat Requirements for Rubber Boas	Creston Valley Wildlife Mgmt. Area Funding by Columbia Basin Trust	1998 - 99
N-33	Operation Bluebird	Friends of Creston Valley Wildlife Management Area Funding by Columbia Basin Trust	1998 - 99
N-37	Habitat Use of Northern Alligator Lizards & Western Skinks	Creston Valley Wildlife Mgmt. Area University of Victoria, Funding by Columbia Basin Trust	1998 - 99
N-115	Mountain Lion Ecology & Ungulate Predation Study	Creston Rod & Gun Club, US Fish & Wildlife Service, Funding by Columbia Basin Trust	Ongoing 1998 - 99
KOOTENAY LAKE			
Fish Projects			
023 & N-20	Kootenay Lake Experimental Fertilization	BC Hydro BC Environment	Ongoing
050	Duncan River Bull Trout Radio Telemetry	University of British Columbia, BC Hydro	1996 - 99
N-2	Meadow Creek Spawning Channel Operations		Ongoing
N-68	Kootenay Lake Fertilization Angling Evaluation	Angling public, BC Hydro, Funding by Columbia Basin Trust	1998 - 99
UPPER KOOTENAY			
Wildlife Projects			
026	Bull Mountain Prescribed Burn Enhancement		Ongoing
028	Sharp-tailed Grouse Transplant Feasibility	Montana Dept of Fish, Wildlife & Parks, Local naturalists, Local rod and gun clubs	1996 - 97
030	Saddle Pasture Prescribed Burn	Ministry of Forests	1997 - 98
031	Townsend's Big-eared Bat Roost Monitoring	St. Mary's Band Ktunaxa/Kinbasket Tribal Council	Ongoing
044	Elk Valley Riparian Assessment		1996 - 97

Task#	Project	Partners	Status
056	Upper Kootenay Bats	Conservation Data Centre	1996 - 97
N-6	Pickering Hills Enhancement	Ministry of Agriculture & Food, Local ranchers, Ministry of Forests, Kootenay Livestock Association, Regional District of East Kootenay Weed Program	Ongoing
N-9	East Kootenay Trench Grasslands Restoration	Rocky Mountain Trench Natural Resources Society, First Nations, Wildlife groups, Range Enhancement Fund, EMBER, Ministry of Forests, Ministry of Agriculture & Food	Ongoing
N-14	Upper Elk Valley Range Enhancement		Ongoing
N-20	MacDonald Marsh Wetland Enhancement	Ducks Unlimited, Aaron MacDonald-Landowner, Funding by Columbia Basin Trust	1998 - 99
N-33	Sheep Mountain Prescribed Burn	Traditional Bowhunters of BC, Funding by Columbia Basin Trust	1998 - 99
N-87	Tobacco Plains Wildlife Habitat Restoration	Tobacco Plains Band, Ktunaxa/Kinbasket Tribal Council, Funding by Columbia Basin Trust	1998 - 99
N-114	Deer Lake Ungulate Winter Range Enhancement	East Kootenay Hunters Association, Funding by Columbia Basin Trust	1998 - 99
N-115	Bighorn Pasture Ungulate Winter Range Enhancement	East Kootenay Hunters Association, Funding by Columbia Basin Trust	1998 - 99
UPPER KOOTENAY			
Fish Projects			
S-1	Cooperative Montana Studies	Montana Dept. of Fish, Wildlife & Parks, Habitat Conservation Trust Fund, Forest Renewal BC	1997 - 98
S-2	Koocanusa Creel	Montana Dept. of Fish, Wildlife & Parks	1996 - 97
S-3	Kootenay Lake South Arm Burbot		1996 - 98
S-4	Aberfeldie & Elko Aquatic Inventory	BC Hydro	1996
018	Koocanusa Reservoir Kokanee Spawner Counts	Fernie Rod & Gun Club, Sparwood Rod & Gun Club, Elkford Rod & Gun Club, Montana Dept. of Fish, Wildlife & Parks	Ongoing
027	Upper Kootenay River Bull Trout Radio Telemetry	Fernie Rod & Gun Club, Sparwood Rod & Gun Club, Elkford Rod & Gun Club, Wapati Flyfishers, Montana Dept. of Fish, Wildlife & Parks, Funding by Columbia Basin Trust	1998 - 99
034	Status of Columbia Basin Chiselmouth	East Kootenay Environmental Society, Funding by Columbia Basin Trust	1998 - 99

Task#	Project	Partners	Status
BASIN WIDE			
Wildlife Projects			
002	Land Management	Local community groups	Ongoing
003	Duck Nestbox Monitoring	Golden Rod & Gun Club, Windermere Rod & Gun Club, North Arm Wildlife Club	Ongoing
004	CBFWCP Land Acquisition	Conservation Trust Funds, Wildlife clubs Conservation groups	Ongoing
005	Enhancement Project Identification & Development		Ongoing
006	Large Mammal Monitoring Plan	Canal Flats Wilderness Club, Kimberly Wildlife & Wilderness Club, Elkford Rod & Gun Club, Fernie Rod & Gun Club, Lake Windermere Rod & Gun Club, Traditional Bowhunters of BC, Sparwood & District Fish & Wildlife Club	Ongoing
008	Site Enhancement Monitoring		Ongoing
016	Wildlife Strategic Plan		1995 - 98
018	Avalanche Path Habitat Study	Ministry of Forests	1995 - 2000
027	Small Wildlife Projects	East Kootenay Environmental Society, Ducks Unlimited	Ongoing
032	Small Red-Listed Mammals Status Study	Royal BC Museum, Forest Renewal BC	1995 - 2000
034	Biophysical Map Digitizing		1996 - 97
B-6	Geographic Information System (GIS) Support		Ongoing
N-11	R.M. Bighorn Sheep Habitat and Population Assessment		Ongoing
BASIN WIDE			
Fish Projects			
009	Solar Aerator Testing	University of British Columbia	1995 - 96
018	White Sturgeon Conservation in Reservoirs	Habitat Conservation Trust Fund, BC Hydro	1995 - 99
030	Painted Turtle Crossing Assessment	Arrow Heights Elementary School, Revelstoke Municipal Government, Friends of Mt. Revelstoke & Glacier Ministry of Transportation & Highways BC Hydro; City of Cranbrook; Rocky Mountain Naturalists	Ongoing
031	Public Interaction - Project Identification		Ongoing
032	Angler Log Book Program	Local Anglers	1995 - 96
033	CBFWCP Fisheries Strategic Plan	BC Hydro BC Environment	Ongoing
037	Small Works Program	General Public Local wildlife clubs Local conservation groups	Ongoing

Glossary

Columbia Basin

FISH & WILDLIFE
Compensation
Program

www.cbfishwildlife.org

BC hydro

British Columbia

Apthona nigriscutis
One of several insects approved for release in North America in 1989 and widely used in Western Canada, lays its eggs on leafy spurge. The larva feeds on the spurge's roots and kills the weed.

Arrow Lakes Reservoir
Created in 1968, the Arrow Reservoir is formed from two natural lakes—Upper Arrow and Lower Arrow—and has water storage capabilities of 8.8 trillion cubic meters. Water levels are maintained between 420 – 440 m. The water flow is regulated between the Revelstoke Dam and Hugh Keenleyside Dam.

Bio-agent
An insect (or microorganism) introduced in a controlled setting to help manage or eliminate a specific species (e.g. Leafy Spurge or Purple Loosestrife) where other control mechanisms such as herbicides are ineffective or environmentally unsafe.

Biodiversity
The variety, distribution and abundance of different plants, animals and microorganisms relative to the ecological functions they perform within a specific area or region.

Bioterrain
A map of the physical/geographical characteristics of a region combined with data that is relevant to wildlife habitat, including soil moisture conditions and vegetation.

Black Bears
The American Black Bear currently occupies about 85% of its historical range and has been eliminated from most of the more southerly regions of all provinces, primarily through human encroachment. Ursus americanus requires a mixed forest habitat with a variety of tree and shrub species of varying ages. While mainly vegetarians, they are also scavengers and attracted to carrion which they can scent up to a mile away. Black bears have the lowest reproductive rates of any land mammal in North America - with the possible exception of the muskox. They have several remarkable characteristics: while they mate in midsummer, the fertilized eggs remain unattached to the female's uterus until fall and their minimum body weight in preparation for hibernation is attained. The cubs are born late December to early February which the mother nurtures without having consumed any food for up to five months.

Blue-Listed Species
A **vulnerable** fish or animal that is particularly sensitive to human activities or natural events, and:

a) populations have recovered or increased to a point where extinction is unlikely as long as currently available habitat is preserved or managed;
b) populations have experienced no evidence of a decrease for the last three-to-five years;
c) populations are so low that the species is uncommon within its range or confined to a small geographic area;
d) the species' habitat requires protection and other activities in the area regulated.

Brood stock Collection
The capture of adult fish to obtain eggs and milt, primarily used in hatcheries to increase fish production.

Bull Trout
Bull trout (*Salvelinus confluentus*) are members of the char family and have recently been classified as a separate species from Dolly Varden. Found in lakes and streams throughout the upper and lower Columbia and Kootenay systems, bull trout are identified by a dusky-coloured dorsal fin without bold black marks and the spots on the trout's sides are not surrounded by light haloes. The fish is a sub-surface feeder with kokanee as its primary food source. Bull trout mature slowly and often reach five-seven years of age before beginning to spawn. They can live for more than 20 years and reach a size of nearly 13.5 kg.

Burbot
Lota lota is a member of the codfish family and recognized by its long body, elongated dorsal and anal fins, and a single barbel on the tip of the chin. The burbot, which grows up to 100 cm, is common in lakes and large rivers throughout the upper Columbia and upper Kootenay part of the Columbia River. The primary food sources for larger burbot include kokanee and other small fish, as well as aquatic insect larvae. The burbot, also known as ling cod, spawns in February at nighttime under the ice in shallow bays or in streams. A number of burbot will mill together to form a large ball which may stay together for several minutes. A sport fish, the burbot's liver contains oil comparable to salt-water cod in vitamin richness.

Canopy
A layer of foliage in a forest stand, most often referring to the uppermost layer of foliage, but the term can be used to describe lower layers in a multi-storied stand. It includes above ground leaves, branches and vegetation that provide shade and cover for fish and wildlife.

Conserve
to manage human use of living (animals, plants) and non-living (e.g. soils, nutrients) resources in an ecosystem in an attempt to restore, enhance, protect and sustain the quality and quantity of a desired mix of species and ecosystem conditions for present and future generations.

Creel Survey
The collection of data specific to the number of fish caught by sport fishers on a particular stream or in a particular area such as the Arrow Lakes Reservoir.

Drawdown
The controlled limited drainage of a body of water such as a marsh to improve wildlife habitat and food values. Drawdowns are also used as a method of flood control in reservoirs.

Duncan Dam
Built in 1967 and the first of three BC Hydro Columbia River Treaty dams, Duncan Dam is located 42 km. north of Kaslo. The 40-meter high structure created a 45 km long reservoir that holds 1.7 trillion cubic meters of water.

Duncan/Lardeau Property
A 500 acre parcel of property in the Meadow Creek area purchased by CBFWCP in 1998 to be enhanced for its wildlife values. The property is adjacent to eight similar and inter-connected properties in the area which together form corridors for traveling wildlife.

Enhance
To heighten specific environmental values of a habitat or ecosystem by management intervention to reduce the severity of undesirable impacts.

Escapement
The number of adult fish that return to their spawning grounds in a given period of time.

Extirpation
The elimination or disappearance of a species or subspecies from a particular area, but not from its entire range.

Fauna
All of the animal life found in a specific region, e.g. Columbia Basin.

Fertilization
Adding nutrients, usually phosphorus and nitrogen, to a body of water that are essential to the growth and well being of its living organisms.

Fish Technical Committee
Comprised of four members, two each from BC Government and BC Hydro, this committee is responsible for the review, evaluation and recommendation of fisheries-related projects submitted to CBFWCP.

Fry
The second developmental stage of young salmon and trout. During this stage, the fry is usually less than one year old, has absorbed its yolk sac and is rearing in the stream. The main stages of development are: egg, fry, juvenile and adult when sexual maturity has been reached.

Gerrard Rainbow Trout
A strain of rainbow trout native to the Columbia Basin system, the adult Gerrard are primarily lake dwellers and not normally found in rivers or streams, except during spawning. A slow growing fish, the Gerrard matures later than most rainbow strains and can live for up to 20 years. It feeds mainly on kokanee salmon which helps account for the size of up to 16 kg this popular sport fish can achieve. Gerrard trout over 4.5 kg consume around 200 kokanee per year. A lake with 3000 Gerrard rainbow trout would eat about 600,000 kokanee annually. The Gerrard Rainbow Trout spawn only in the Lardeau River system.

Girdling
A wildlife enhancement technique used for: creating food for browsing ungulates by stimulating suckering (creation of new growth) of favourable browse from shrubs; and creating habitat in trees for cavity-nesting birds and small mammals.

Grizzly Bears
The Grizzly Bear is a subspecies of the Brown Bear which also includes the Kodiak Bear. *Ursus arctos horribilis* are slow-growing, long-living (20-25 years) with low reproductive rates averaging 2 cubs per litter every 3-6 years. Females can grow up to 280 kg (640 lb) while males can achieve sizes of 500 kg (1150 lb) depending on the food supply within their range. Grizzlies have only six months to obtain sufficient food to last a full year. Pregnant females have less time because they den early and exit later. The species have relatively short stomaches. Consumed food passes rapidly through their systems resulting in a high rate of food consumption. In fact, starting around mid July, grizzlies feed 20 hours a day and consume more than 20,000 kcal (1,000 calories) a day in preparation for hibernation. Grizzlies compete directly - and often aggressively - with humans for food and space which greatly affects their nutritional levels and survival.
While population densities vary based on abundance and distribution of food, Glacier National Park has a density of 1:28 sq km, which is considered average. Contrary to popular belief, grizzlies have good eyesight. As well, their hearing is excellent while their sense of smell is superb. Grizzlies are omnivores and their movement patterns within their range is determined by the quality of their food supply at different times of the year. For example, moose and caribou are a main source of their diet, but primarily in the spring when yearlings and winter-starved ungulates are the most vulnerable. While they adapt slowly to changes in their environment, grizzlies can, if given time, adapt behaviorally to altered habitat.

Habitat Complexing
The application of logs, rocks and/or vegetation to enhance stream habitat for fish. For example, boulders that change the water-flow patterns and offer fish shelter are said to add complexity. Primarily, this allows for better spawning and rearing habitat as well as providing cover for fish.

Hibernaculum
The hibernating habitat for bats, typically found in abandoned mines, abandoned buildings and similar enclosures.

Home Range
The area that an animal traverses in the scope of normal activities, such as feeding. For example, the home range of a male badger in the East Kootenay area can be 500 square km, typically much larger than the home range of badgers studied in the US.

Hybridization
The process of interbreeding between two different species, such as yellowfin rainbow trout with other rainbow trout species, either in the wild or under artificial conditions.

Keenleyside Dam
Hugh Keenleyside Dam, located eight km east of Castlegar, controls a drainage area of 22,560 sq km in the Arrow Lakes Reservoir extending 232 km north to Revelstoke. The dam, 52 m high and 853 m long, includes a navigation lock providing passage for river traffic.

Kinbasket Reservoir
Created as a result of the Mica Dam and generating station, this 216 km long water storage reservoir can see its water level decrease/increase by up to 24 meters from 744 meters in late summer to 730 meters in April.

Knapweed
Introduced from Eurasia in the early 1900's and with no natural enemies or parasites, Knapweed spread rapidly across BC and became well established in this area over the past three decades. Both types of the weed, Diffuse and Spotted, are present in the Columbia Basin. **Diffuse Knapweed** is recognizable by its white (sometimes pink or purple) urn-shaped flower surrounded by yellowish green bracts with narrow stiff spines. **Spotted Knapweed** has pink to purple flowers with a black-tipped fringe, giving the flowerhead a spotted appearance. Both types contain volatile oils which have an extremely bitter, non-poisonous taste.
Both species invade grassland sites and outcompete all native vegetation. As well as severely reducing the grasses and herbs food supply of domestic animals, knapweed encroachment can also destroy wildlife forage resulting in significant declines in deer and elk populations.
Over 40,000 hectares (100,000 acres) in BC are currently infested, potentially reducing forage by up to 90% in some areas.
Successful long-term control requires a combination of proper grazing management, judicious herbicide use, bio-agent control and a high level of public awareness and responsibility. While these plants are highly resistant to most herbicides, several insects have proven effective including seed-reducing flies and moths, and a root-feeding beetle.

Kokanee
Sockeye salmon that became landlocked in BC lakes after the last ice age and adapted to their freshwater habitat, kokanee (*Oncorhynchus nerka*) occupy open waters at intermediate depths. While their primary food source is zooplankton and phytoplankton, kokanee will also eat insects and mysid shrimp. Kokanee have retained many of the biological and instinctive characteristics of their sockeye ancestors. After four to five years in the lake, red-flanked adult salmon will return to their spawning stream in the fall, lay and fertilize their eggs, and then die. The kokanee, which can grow to 4.5 kg, is a popular sport fish but serves a more important function as the main food source for bull trout and Gerrard rainbow trout.

Koocanusa Reservoir
Formed by the Libby Dam in Montana as part of the Canada/US Columbia Treaty, this reservoir is 145 km long, with the upper 68 km located in BC. Water levels are controlled by the Libby Dam at Libby, Montana, 77 km south of the BC border. The dam, constructed and operated by the US Army Corps of Engineers, is owned by the US government.

Leafy Spurge
A perennial, hardy weed that spreads by seeds as well as buds on persistent, creeping roots, leafy spurge is an aggressive competitor with no natural enemies. The weed grows quickly in clumps, forming dense and extensive stands. A nonindigenous plant, leafy spurge has spread from Pacific northwest states into the grasslands and open forests of the southern BC interior, including the East Kootenay and Boundary regions. All parts of the plant contain a milky-coloured latex juice that can poison livestock and cause skin irritations on humans. Herbicides are ineffective in controlling leafy spurge. The best control methods involve using approved Euroasian bio-agents, specifically several subspecies of flea-beetles and moths.

Lewis Woodpecker
While the Lewis Woodpecker ranges throughout Southern BC, Bull Mountain is one of the only known local wintering habitat site in Western Canada. *Melanerpes lewis*, which can grow to 29 cm from beak to tail, is identifiable by the extensive pinkish red belly (the only North America woodpecker with this colour) and wide black wings. The preferred habitat of the Lewis Woodpecker is burns, scattered or logged forests, river groves and foothills.

Limnology
The study of aquatic ecology or interactions between aquatic organisms and their physical and chemical environments.

Mica Dam
The largest of the three Columbia River Treaty hydroelectric developments, Mica rises 200 m above the riverbed and is an earthfill structure made up of 33 million cu m of gravel, sand, rock and glacial till. The dam, in operation since 1973, impounds the Kinbasket Reservoir as well as regulates water flow into Revelstoke Reservoir.

Mitigate
To reduce the severity of impacts on fish or wildlife habitat.

Moose
Alces alces is the largest member of the deer family and one of the largest land mammals in North America. Males can weigh up to 595 kg and females 418 kg. The life cycle of the moose begins with rutting season from early September to late November. After a gestation period of eight months, females typically give birth to one calf, although two is not uncommon, in late May or June. The pregnant female seeks seclusion as birth time approaches and will aggressively drive away her young from the previous year to devote her attention to the new calf. The newborn calf is licked copiously and regularly, establishing a strong cow-calf bond. Moose calves receive a substantial proportion of its food from its mother's milk until fall.
There are four subspecies of moose including the Columbia Basin's Shira's moose (*Alces alces shirasi*). They are solitary animals and keep to a small home range of 5-10 sq km. While moose are not territorial, cows are very aggressive to one another during the rut, in contrast to other antlered species.
Moose are a very hardy and adaptable species, evident in that they winter successfully in some of the coldest regions of the world. They will adapt to a variety of available forage, but their preferences is early succession plants found in new growth areas after fires and logging, willow, forbs and aquatic plants.
The primary limiting factor of moose populations is good habitat. Their winter mortality is related to snow depth, density, hardness and the duration of these factors. As well as restricting forage, deep snow leaves moose snowbound and vulnerable to wolf predation. Other mortality causes include: bear predation on calves in spring; competition for forage with deer, elk and livestock; and collisions with vehicles and trains.

Mountain Caribou

A member of the deer family, caribou are unique in that both the male and females have antlers. Nonpregnant females shed their antlers in March or April, while pregnant females will shed their antlers at the time of calving. Breeding occurs during a one-week period between mid to late October and, after a gestation of 228 days, 90% of the females will give birth to a single calf within a 10-day period.

Caribou's reproduction rate is low while the mortality rate is high. While calves are able to follow their mothers around within one hour after birth, they are highly vulnerable to predation. Calf mortality can exceed 90% where there are high densities of wolves and/or grizzlies. As well as predation, calves are susceptible to wind chill and starvation.

Caribou are highly adapted to their environment and adaptable to a changing environment. They eat a wider variety of plants than other deer species, but prefer green vascular plants, mushrooms, grasses, sedges and cottongrass. In winter when the snow crust will support their weight, caribou will shift from open habitats to forest cover seeking arboreal lichens growing on coniferous trees. As well, they can smell food buried under snow up to 18 cm.

Ideal winter feeding conditions include: irregular terrain with variable snow depths; habitat with three vegetation strata - ground, shrubs and well-spaced trees; and shallow, hard snow.

Mule Deer

The populations of Rocky Mountain Mule Deer (*Odocoileus hemionus hemionus*) is larger than all 11 mule deer subspecies in North America combined. Remarkably adaptable, this mule deer is migratory and will travel 80 km or more from summer to winter ranges. They breed in November-December and will typically bear two fawns in June which minimizes fawn exposure to late spring or early fall snowstorms.

Mule deer capitalize on abundant and nutritious forage in summer and fall for growth and weight gain, and minimize intake and expenditure in winter when energy costs are high and forage is poor. They store fat rapidly from April to October, but deplete most of it by December and reach a low weight in March. Females gain and lose weight more slowly and reach their low weight in May. The survival of mule deer is a matter of enduring too long periods of inadequate forage, an environment they have evolved in and adapted to in North America.

Intermediate feeders rather than browsers, mule deer consume a wide range of forage types in a wide range of climatic conditions. Major causes of population declines are: human encroachment in deer habitat; predation; forest fire suppression; forest encroachment; excessive hunting; and collision with vehicles.

Mysid Shrimp

An exotic shrimp introduced into Kootenay Lake from Upper Waterton Lake (Alberta) in 1949 as a supplementary food source for intermediate-sized rainbow trout and in Arrow Lakes Reservoir in 1968 for young fish-eating trout. Instead, the shrimp became an efficient competitor with kokanee for zooplankton.

Nestbox

Constructed with 1" cedar, these new custom-built homes for tree cavity-nesting ducks are placed in cottonwood and aspen trees seven to ten metres off the ground. Six species of cavity-nesting ducks use these nestboxes. While there are good stands of cottonwood and aspen trees—the ducks' preferred nesting sites—in their wetlands habitat, there are not enough natural tree cavities to support the total populations' needs.

Nitrogen
A colourless, tasteless, odourless gaseous element which makes up 78% of earth's atmosphere, nitrogen is an essential component of proteins and nucleic acids required by all living organisms. In the aquatic food chain, nitrogen enters lakes through the air as nitrates where it is converted to complex organic compounds by bacterial action and absorbed by drifting, microscopic plants called phytoplankton. Phytoplankton is consumed by zooplankton which, in turn is eaten by mysid shrimp and kokanee salmon. These salmon are the main food source of bull trout and Gerrard rainbow trout. When aquatic living organisms die and decay, the complex organic compounds are reduced to nitrates again to complete the nitrogen cycle.
If lakes don't have adequate water flows and circulation, the nitrates settle on the bottom where they are locked in and effectively removed from the nitrogen cycle and the food chain. This reduces the abundance of phytoplankton and the domino effect can contribute to declines in kokanee populations and sizes.

Northern Leopard Frog
Once a very common species in northwestern US and BC, and a favourite specimen in high school biology experiments, their populations have been decimated by several causes including: diseases believed to be related to environmental stress; habitat loss; and increase in ultraviolet light exposure resulting from a thinning ozone layer. The preferred habitat of *Rana pipiens* is marshes, wet meadows, river banks and moist, open woods.

Northern Long-Eared Bat
One of the rarest bats in BC, two of only three known habitats are in the Revelstoke area. It's diverse diet includes caddisflies, moths, beetles, flies and leafhoppers. *Myotis septentrionalis* hibernates alone in caves and abandoned mine tunnels, has small maternity colonies of up to 30 individuals and females produce a single young in late June to early July.

Nutrient Levels
The amount of nutrients, particularly phosphorus and nitrogen in water bodies, in an ecosystem.

Oligotrophic
Waters that are poor in disolved nutrients, have low photosynthetic productivity, and are rich in disolved oxygen at all depths.

Painted Turtle
The most common turtle in the United States, *Chrysemys picta* is found in only southern parts of Canada and is blue-listed as a rare and vulnerable species in many parts of the Columbia Basin. Its name comes from the bright red and yellow markings on a black or greenish brown flat shell and distinctive yellow stripes on the head and neck. Painted turtles are small: only 6 to 25 cm with the female growing larger than the male.
The painted turtle breathes by forcing air in and out of its lungs by alternately contracting the flank and shoulder muscles. It can't expand its chest to breathe because the ribs are fused to the shell. The turtle prefers quiet, shallow, thickly-planted freshwater with a muddy bottom. It's main food diet includes worms, minnows and aquatic insects.
Painted turtles mate in the fall and spring. In June to early July the females travel a short distance to an area where they lay 5 to15 oval, soft-shelled eggs in a flask-shaped hole they dig with their hind legs. The eggs hatch in about 10 weeks. Lacking sex chromosomes, the sex of painted turtles is determined by temperature during incubation: low temperatures make males and high temperatures produce females. Hatchlings face heavy predation from ravens, gulls and Great Blue Herons from the time they leave the nest. Quick movements, good sense of smell and colour vision are their defenses against predators.
To rid themselves of parasitic leeches, the turtles bask in the sun on rocks, stumps or trees partially submerged in water, often in large groups. Under stressful conditions in captivity they can produce Salmonella.

Paleolimnology
The study of the physical properties of freshwater lakes in prehistoric times, specifically Upper Arrow Lake geochemistry (nitrogen, carbon and phosphorus) conditions, algae evolution and fossil zooplankton.

Partnering
The synergistic affect from pooling of resources to work together toward a common goal. This reduces duplication of effort, helps ensure that the appropriate level of resources are available. The savings in time, money and expertise can then be reinvested into other projects.

Phytoplankton
A microscopic plant life that are an important source of food for zooplankton, which are, in turn, food for kokanee and mysid shrimp. Fertilization projects underway in Kootenay Lake and the Arrow Lakes are adding nitrogen and phosphorus to these water systems to produce healthy levels of phytoplankton to stimulate the food chain.

Phosphorus
An allotropic (element that can exist in two or more forms, e.g. diamonds and graphite are allotropes of carbon) nonmetallic element in phosphates, phosphorus is a nutrient required by all living organisms. Phosphates occur naturally in the different strata of rocks throughout the earth including under bodies of water such as lakes. In the aquatic food chain, phosphates are leached into the water where it is converted by bacteria into the complex organic compound phosphorus and absorbed by phytoplankton (drifting microscopic plants).
Phytoplankton is consumed by zooplankton which, in turn is eaten by mysid shrimp and kokanee salmon. These salmon are the main food source of bull trout and Gerrard Rainbow Trout. When aquatic living organisms die and decay, the complex organic compounds are reduced to phosphates again to complete the cycle. Some phosphates settle on the bottom where they are locked in and effectively removed from the food chain. This reduces the abundance of phytoplankton and the domino effect can contribute to declines in kokanee populations and sizes.

Prescribed Burn
The planned use of carefully controlled fire for habitat enhancement. Prescribed burns are commonly used to prepare a site for planting, create a better quality browse for wildlife, manage a fire hazard and reduce pest problems. The timing of the burn is determined by a combination of conditions including weather, fuel moisture, soil moisture and relative humidity to ensure the fire is confined to the planned area. For example, the Saddle Pasture prescribed burn took nearly two years to implement because of unacceptable weather conditions.

Productivity
The gain in weight which the total number of a species in a specified area (e.g. kokanee in Kootenay Lake), or the total number of all living organisms in a specified area, accumulates in a given period of time.

Protect
To manage the conservation of ecosystems, habitat or species by management intervention.

Protection Projects
Improvements to habitats to ensure the preservation of resident fish and wildlife populations.

Public Involvement Process
An important focus of the Program where residents and interested groups are encouraged to submit specific projects in which they will participate and that will protect or enhance fish, wildlife or their habitats in the Columbia Basin.

Purple Loosestrife
Accidently introduced to North America from Europe in the 1800's, purple loosestrife has made a slow relentless invasion of wetlands across Canada. While the weed prefers wetlands, it is as devastatingly effective in dryland habitats as well. Each plant can produce up to 2.7 million seeds a year. Growing up to 2 metres high with square woody stocks, a colony of purple loosestrife forces wildlife to consume native vegetation around the weed, creating more space for new loosestrife to grow. Pulling and digging the plants by hand, a labour-intensive exercise, is still one of the most effective ways of dealing with the infestation problem.

Rearing Habitat
Areas in rivers or streams where juvenile salmon and trout find food and shelter to live and grow.

Red-Listed Species
An endangered or threatened fish or animal facing imminent extinction or extirpation (no longer live in the wild in BC but do live elsewhere) if certain factors are not reversed. These factors include: very few native populations exist; and remaining populations are declining drastically due to habitat loss, excessive harvest, natural catastrophes, environmental stresses or other factors caused by human activities such as pollutants. The criteria include:

a) the number of offspring that survive to an age where they can reproduce is only marginally higher or lower than the number of offspring that die during the same time period;
b) habitat essential to the species' survival is adequately protected for the foreseeable future through management and preservation;
c) the population is stable or increasing but their numbers are still very small;
d) captive or cultivated stock may have to be used if the remaining population isn't large enough to reproduce sufficient numbers of offspring; and
e) the factors causing the species' decline are still evident.

Rehabilitate
To restore the functions and processes of a degraded ecosystem or habitat to an effective state rather than an original state.

Restore
To return ecosystems or habitats to their original structure and species composition.

Revelstoke Dam
Located about five km north of Revelstoke, the dam created a reservoir 130 km long extending back to Mica Dam and has a surface area of 11,534 hectares. The dam is a 175 m high concrete gravity structure with a 122 m high earthfill dam.

Riparian zone
The area of land from the shoreline of a river or lake to roughly 30 – 60 metres inland. This habitat supports a wide variety of species dependent on water systems including raptors.

Rocky Mountain Bighorn Sheep

One of three types of mountain sheep in North America, the Rocky Mountain Bighorn sheep is the biggest with the ram weighing up to 143 kg and the ewe 91 kg. Few animals are as well adapted to extremes of elevation and temperature. Their preferred range is rocky escape terrain in close proximity to open stands of their preferred food: grasses, sedges and shrubs. Browse vegetation are important foods during fall and winter. The sheep is also attracted to natural and artificial salt licks, particularly during spring and early summer, to correct a sodium imbalance caused by high intakes of potassium and water from new spring forage. R.M. Bighorn sheep are highly social animals that are separated into two groups: nursery bands of ewes, lambs and subadults that stay on smaller nursery ranges; and ram bands comprised of males three years old and older that forage away from the nursery range and travel great distances to known feeding ranges. These two groups come together to rut in November/December and again in the spring as sprouting vegetation appears.

The total population of all R.M. Bighorn sheep in North America numbers less than 25,000, with over 14,000 in British Columbia. Competition with livestock for food and parasites/diseases contracted from livestock are major causes for this bighorn sheep's decline. Pneumonia caused by Lungworm, one of 51 strains of parasites and diseases they contract from livestock, have been known to decimate herds particularly in overprotected and overcrowded ranges.

Sharp-tailed Grouse

While still fairly common inland in the northwestern US and Western Canada, sharp-tailed grouse populations have been on the decline. A pale and speckled brown grouse, *Tympamuchus phasianellus* can be recognized by its short pointed tail which shows white at the sides when in flight. The displaying male inflates purplish neck sacs. The preferred habitat of Sharp-tailed Grouse includes prairie, clearings, open burns in coniferous forests, forest edges and bushy groves.

Silviculture

The science and practice of controlling the establishment, growth, composition, health and diversity of forests and woodlands. Silviculture entails the manipulation of forest and woodland vegetation in stands and on landscapes.

Spawning Channel

A man-made 'tributary' that simulates habitat conditions fish need to spawn naturally and on their own. This includes streamside vegetation and gravel beds at a uniform width and depth with pockets of deeper pools. A channel is constructed according to the species' requirements and their projected numbers. For example, the Hill Creek spawning channel is 3.2 km long and designed to accommodate 100,000 kokanee requiring .5 sq m of space for each fish.

The survival rate of fry and eggs are substantially higher in man-made channels than natural tributaries. Kokanee have a five percent survival rate in natural spawning tributaries, but 30% – 60% survival in the spawning channel.

Stand Management Prescription

A site-specific operational plan describing the nature and extent of silviculture activities planned for a free-growing stand of trees for specified social, economic and environmental results.

Sustain

To maintain desired levels of ecological processes and functions, biological diversity and productivity of an ecosystem over the long term.

Tagging
CBFWCP biologists use a variety of radio-tagging methods to gather information in fish and wildlife projects. These include radio telemetry collars on wolverines, implants in bull trout and yellow-fin rainbow trout and "fanny packs" on Northern leopard frogs. Tagging is used to study the movement, migration, habitat requirements and other behavioral characteristics of a species very accurately and cost effectively.

Telemetry
The tracking of subjects using radio transmitters and receivers, often by plane or satellite. The radio transmitters can be in the form of collars (on animals) or implants (on fish).

Townsend's Big-eared Bat
The maternal colony in the Saint Eugene Mission on the St. Mary's Band Reserve represents 25% of all known Townsend's Big-eared bats in Canada. Unlike many bat species which travel great distances to hibernate, *Plecotus townsendii* travels only about 40 km between their maternity roosts and hibernacula (hibernating roost). Also known as the Lump-nosed bat and Western Big-eared bat, they are identified by enormous ears almost one-half its body length. Townsend's Bat feeds primarily on small moths and grows to only 12 grams—little more than the weight of a loonie. A single pup is born in July and is flying in three weeks.

Ungulates
Hoofed, grazing mammals, many of which have horns and double stomaches, in the group *Ungulata*. In the Columbia Basin, these include deer, elk, bighorn sheep, moose, mountain goat and caribou.

Wetlands
Areas of land inundated by surface water and groundwater supporting vegetative or aquatic life that require saturated or seasonally saturated soil conditions for growth and reproduction. There are five wetland classes: bogs, fens, marches, swamps and shallow open waters.

Wildlife Technical Committee
Comprised of five members, three from BC Government and two from BC Hydro, this committee is responsible for the review, evaluation and recommendation of wildlife-related projects submitted to CBFWCP.

Wolverine
Solitary, secretive animals that live primarily in boreal forests and tundra areas, wolverines typically occupy back country or wilderness areas that have little human activity or development. *Gulo gulo* have few natural enemies and are very well suited for the environment in which they live. They have exceptional stamina and can cover great distances in a relatively short time period. Wolverines can withstand severe cold, exhibit keen senses of hearing and smell, have a caching instinct and can defend a food source from larger predators. Their extremely strong teeth and jaws can crush bones up to the size of the bones of an adult moose. While wolverines have poor evesight, their acute sense of smell can locate carrion buried under 200cm of snow. Their average weight is 10 – 17 kg for males and 7 – 14 kg for females.
Wolverines breed during early summer and carry the dormant unimplanted embryo until the following December or January when implantation occurs. Litters are 2 – 3 kits with each weighing an average of 84 g when born. At one per 150 – 200 sq km, wolverine population densities are low compared to other carnivores. Their home range sizes are large, averaging one every 535 sq km. Like many carnivores, their density and home range is related to the abundance and availability of food. An opportunitistic feeder, wolverines are capable predators and efficient scavengers. Carrion is a major food source, particularly moose, elk, caribou and deer. They are also a successful predator of small mammals including grouse, ptarmigan, voles, mice and squirrels. Primarily nocturnal animals, wolverines are active year round and don't migrate from their home range.

Yellow (East Kootenay) Badger

A predominently nocturnal, secretive animal that spends daylight hours underground, the badger is poorly understood because of the inherent difficulty in collecting information on the species. *Taridea taxus jeffersonii* is one of four subspecies of the North American badger and its BC range is limited strictly to the Southern Interior and the southern part of the Cariboo region.

The badger's body and other physical characteristics have moulded uniquely to its fossarial (adapted to digging) existence: stout, compact animal built low to the ground; very muscular forelegs and long curved claws up to five cm long; toes partially webbed to remove loose soil; and a body nearly as wide as it is long allowing greater maneuverability underground.

The badger breeds May-August but implantation is delayed until January or February. The female gives birth to an average of two young in March/April after an eight-week gestation period. The delayed implantation, a unique characteristic of only several mammals including the black bear, helps synchronize birth with maximum food availability to enhance their survival rate. Females breed very early, occasionally having young before they are two years old.

Badger populations are composed of two kinds of individuals: adults with established home ranges that shrink and expand seasonally; and juveniles without permanent homes that sometimes travel long distances as they disperse from their natal area. Home ranges of East Kootenay badgers overlap, averaging in size of 475 sq km for males and 46 sq km for females. Their preferred habitat is treeless areas such as grasslands, cultivated fields, cutblocks and open forests. They use a series of dens throughout their home range, usually moving to a different den daily. About 70% of the dens used were previously dug.

The badger is an efficient predator of fossorial prey, such as ground hogs, which make up most of their diet. They are opportunistic feeders and supplement their diets with a wide range of mammals, birds, eggs, reptiles, amphibians and invertebrates. This allows them to adjust to seasonal availability. As well, badger are physiologically and behaviorally adapted to deal with food shortages and cold temperatures. They can reduce heat loss and limit energy expenditure by remaining inactive within the den during the coldest periods. While badgers have few natural enemies, their populations are particularly sensitive to human-caused mortality. Roadkills, human intolerance and accidental capture in traps set for coyotes can account for 90% of badger deaths in some populations.

Yellow Fin Rainbow Trout

The Arrow Lakes traditionally supported a trophy rainbow trout fishery for the piscivorous (fish-eating) yellow fin rainbow trout. These fish were large (up to 14 kg) with a yellow-orange colour on their bellies and pectoral, pelvic and anal fins. The flooding of the lakes almost completely eradicated this stock and few of these fish were caught between the mid-seventies and early eighties.

Earlier attempts to preserve and enhance this population by collecting brood stock had some success. However, this method was very labour-intensive and insufficient numbers of adults were found and collected to help the yellow fin make a comeback.

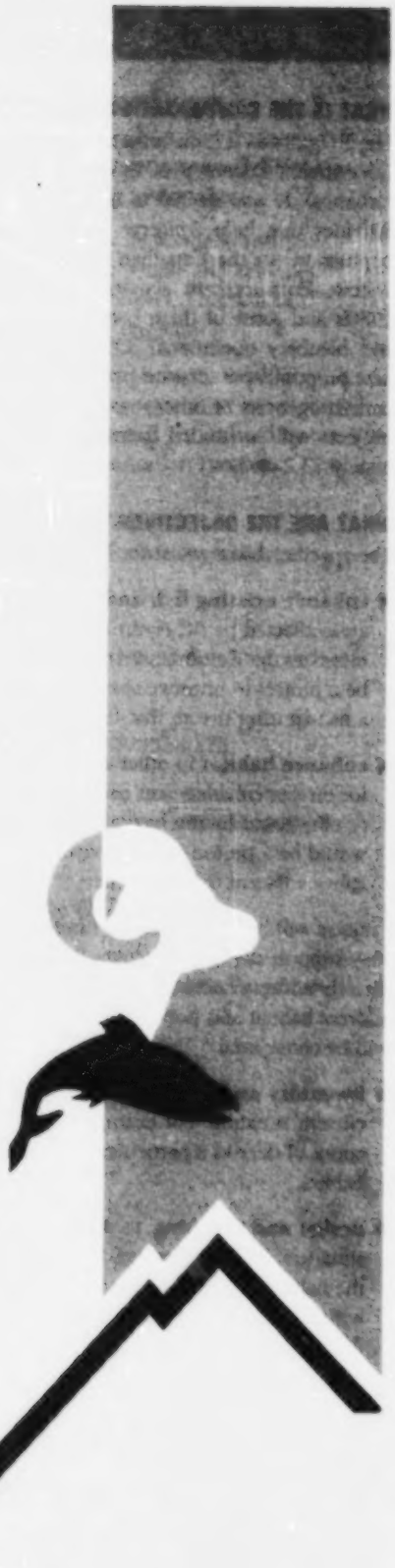
Zooplankton

Drifting or floating microscopic animals found at various depths in lakes, rivers and seas. Zooplankton is the primary food source for kokanee and mysid shrimp.

Project Application Information

Project deadline is August 1.

Applicants are encouraged to involve CBFWCP biologists or the appropriate representative in preparing their project applications for submission.



Columbia Basin

FISH & WILDLIFE Compensation Program

www.cbfishwildlife.org

BC hydro

British Columbia

Project Information

WHAT IS THE COMPENSATION PROGRAM?

The Program is a joint initiative between BC Hydro and BC Government (Ministry of Environment, Lands & Parks, BC Fisheries). It was created to coordinate and fund a variety of activities that help conserve and enhance fish and wildlife populations in the Canadian portion of the Columbia River system. Enhancement activities were initiated in the early 1980's and some of them continue (e.g., spawning channels and hatchery operations). Other activities will evolve from new proposals put forward by members of the public, the two partner agencies or other organizations. All ongoing and new projects will be funded from the annual budget of approximately $3.2 million.

WHAT ARE THE OBJECTIVES OF THE PROGRAM?

The specific objectives of the Program are to:

- **enhance existing fish and wildlife** habitat in areas affected by BC Hydro's hydro-electric developments in the Columbia River Basin. An example would be a project to improve spawning areas at the mouth of a fish-bearing stream that feeds into a reservoir.
- **enhance habitat** in other areas where the opportunity for on-site enhancement has been significantly reduced or eliminated by reservoir development. An example would be a project to improve deer winter range in a valley adjacent to a reservoir.

Projects will be considered for funding under this Program if they support the two objectives listed above. Activities may directly address habitat enhancement or they may indirectly address habitat and population issues. Four types of activities will be considered:

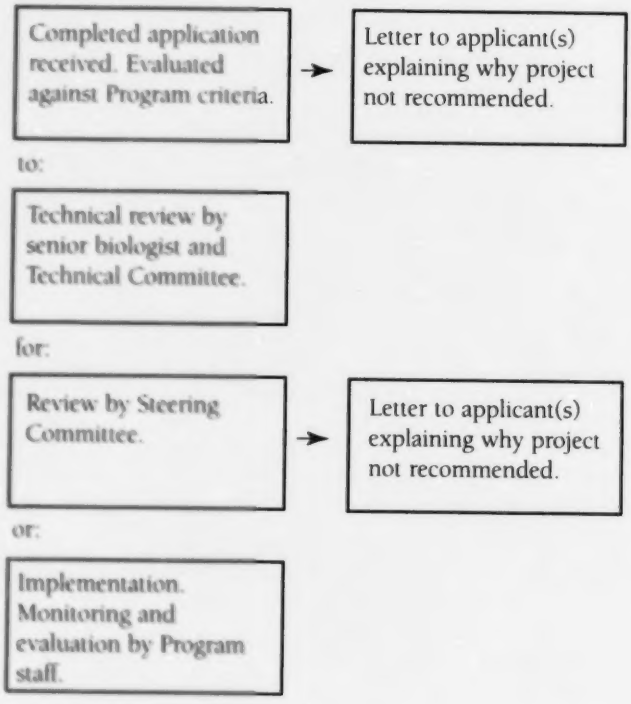
- **inventory and assessment**, to describe the current situation. For example, conducting a population count of deer in a particular area and assessing their habitat.
- **design and planning**, to define how the current situation can be improved. For example, researching the habitat needs of deer, comparing these requirements with the results of a habitat assessment, and then developing a plan to achieve improved habitat.
- **enhancement** or **rehabilitation** activities to benefit specific fish or wildlife populations.
- follow-up **evaluation** and **monitoring** to ensure goals are met.

In order to be funded by the Columbia Basin Fish & Wildlife Compensation Program, projects must occur within the defined Program area. This includes most of the Columbia River Basin in Canada, extending from Valemount area in the north to Grasmere in the southeast and Rossland in the southwest. Note that the Flathead, Kettle and Okanagan river drainages are not included in the Program area.

A summary of previously approved projects from both fisheries and wildlife is available from the Program office or our website **cbfishwildlife.org** The address is included with this application form.

HOW ARE PROJECTS SELECTED?

Project applications are reviewed by various individuals and committees to ensure that they are cost effective, achievable, biologically appropriate and socially desirable. The following flow-chart illustrates the process.


Completed application received. Evaluated against Program criteria.
Letter to applicant(s) explaining why project not recommended.
to:
Technical review by senior biologist and Technical Committee.
for:
Review by Steering Committee.
Letter to applicant(s) explaining why project not recommended.
or:
Implementation. Monitoring and evaluation by Program staff.

Project Information

The final project review and selection is made by the Steering Committee, which is also responsible for the overall direction of the Program. Members of the Steering Committee are:

BC Government
Rick Morley – Co-chair, Ministry of Environment, Lands & Parks (Nelson)
Ted Down, BC Fisheries (Victoria)

BC Hydro
Dave Cattanach – Co-chair (Burnaby)
Willi Friml (Castlegar)

Public Representatives*
Southwest Kootenays – Richard Spilker (Nelson)
Ph. (250) 352-2660
Email: spilk@direct.ca

Northern Kootenays – Pat Wells (Revelstoke)
Ph. (250) 837-5792

Southeast Kootenays – Jim Zimmerman (Elkford)
Ph. (250) 865-4556

First Nations Representative*
Ktunaxa-Kinbasket Tribal Council – Joe Nicholas (Windermere)
Ph. (250) 342-6301

*You are encouraged to contact the nearest appropriate representative or Program biologist to discuss your project idea before submitting your application.

WHAT KINDS OF PROJECTS WILL NOT MEET CRITERIA?

The Compensation Program will support activities that complement and do not duplicate the work of other agencies and organizations, and will seek partnerships with other groups whenever possible.

The following activities are examples of unacceptable projects. Please ensure your project proposal does not include:

- construction of boat launches, recreational access and recreation sites
- debris clean-up on reservoirs
- ongoing administrative costs for interest groups or organizations
- compensation for individual losses resulting from hydro-electric development
- promotion of business opportunities
- formal public education projects

In addition, projects must conform with current resources management objectives and with established practices.

WHAT IS THE APPLICANT'S RESPONSIBILITY?

Apart from the work you propose and agree to do in your project, ***there are two other important responsibilities you must be aware of and be willing to undertake:***

1. Once a project is accepted, adequate accident insurance coverage must be arranged for all people and activities involved for the duration of the project. This will be arranged in conjunction with the Program.

2. To receive project funding, invoices accompanied by supporting documents, such as receipts, must be submitted to the Program office. Note that funds not utilized by the project are retained by the Compensation Program.

IS TECHNICAL SUPPORT AVAILABLE?

If you need further assistance or information, contact the nearest Program office.

Nelson
Columbia Basin Fish & Wildlife Compensation Program
103 – 333 Victoria Street
Nelson, BC V1L 4K3
Phone: (250) 352-6874 Fax: (250) 352-6178

Invermere
Columbia Basin Fish & Wildlife Compensation Program
2 – 108 Industrial Road #2
Athalmere, BC V0A 1K5
Phone: (250) 342-3941 Fax: (250) 342-3986

Revelstoke
Columbia Basin Fish & Wildlife Compensation Program
Box 500
1200 Powerhouse Road
Revelstoke, BC V0E 2S0
Phone: (250) 837-2538 Fax (250) 837-9600

APPLICATION DEADLINE
August 1st

Project Evaluation Criteria

Project evaluation is a three stage process involving a non-ranked set of required criteria, a ranked set of criteria applied by the Technical Committees and a non-ranked set of considerations applied by the Steering Committee. Members of the Technical Committees are:

Fish Technical Committee
Jay Hammond – Chair, MoELP (Nelson)
Ken Ashley, BC Fisheries (Vancouver)
David Wilson, BC Hydro (Burnaby)
Gary Birch, BC Hydro (Castlegar)

Wildlife Technical Committee
Guy Woods – Chair, MoELP (Nelson)
Bob Forbes, MoELP (Cranbrook)
Glen Watts, MoELP (Prince George)
Ed Hill, BC Hydro (Burnaby)
Alan Chan-McLeod, BC Hydro (Burnaby)

Communications Committee
Barry Bartlett, CBFWCP (Nelson)
Diane Tammen, BC Hydro (Cranbrook)
Bill Macpherson, MoELP (Nelson)

STAGE 1 - ACCEPTABILITY CRITERIA

Any project submitted to the CBFWCP must meet these criteria before receiving further consideration:

1. Consistent with CBFWCP objectives (they act to sustain or enhance fish populations and to preserve, rehabilitate or enhance habitat);
2. Consistent with MoELP/BCH mandates and policies and with local MoELP management goals;
3. Compatible with other resource management objectives;
4. Based on sound biological principles;
5. Within the Program area, as defined by the Administrative Agreement.

Tasks must not include any of the following objectives, activities or results:

1. Assume task liability resulting from the actions of a third party (not represented within the Program) or of a single partner or participant in the Program operating outside of the consensus and agreement of those represented on the program committees;
2. Act as a source of substitute support for other stakeholder mandates or funding;
3. Involve enforcement, habitat referrals, development of harvest allocation and control measures, evaluation of harvest management, or other management activities unrelated to the Program mandate;
4. Involve land purchases not directly related to the strategic objective of the Program;
5. Address reservoir, dam, or powerplant operational impacts, unless they constrain the effectiveness of footprint remedial measures;
6. Involve the development, evaluation, maintenance or upgrading of recreational access (i.e. boat launches) or sites;
7. Involve debris accumulation assessment or cleanup on reservoirs;
8. Involve studies or compensation initiatives related to the upgrade, rehabilitation, expansion or development of new hydroelectric projects unless adequate additional funding is provided and a delivery agreement is reached between the Program and the proponent;
9. Cover existing or future industrial and/or municipal development projects' compensation needs;
10. Cover operating or land claim costs or involve compensation to individuals, interest groups, First Nations or companies;
11. Allow for direct management of consultant contracts by any group other than the Program or its designates; and
12. Involve job creation, training or education support beyond that which directly benefits the activities or objectives of the program.

STAGE 2 – RANKING PROJECT PROPOSALS

These criteria are specific to the Technical Committee ranking process. If the task is a continuing project, as designated by the Steering Committee, no further ranking is required.

Fish tasks are to be ranked based on ratings and weightings for a series of criteria. Each criterion has a maximum rating of 5 points. Ratings are generally assigned subjectively following discussion among Technical Committee members. For these criteria, suggested conditions for assigning ratings are provided on the following page. In a limited number of cases, ratings are based on specific objectives. Criteria ratings are then weighted according to their relative importance. Suggested weightings have also been provided on the following page.Wildlife tasks are ranked based on their raw scores.

		Fish Technical Committee			Wildlife Technical Committee
No.	Criteria	Rate	Weight	Score	Score
1	Conservation of indigenous species and wild fish stocks	5	10	50	
2	Protects or augments sensitive or valuable habitats	5	7.5	37.5	10
3	Improves or maintains local or regional species diversity	5	5	25	
4	Ongoing/existing work requiring continuity	5	2.5	12.5	3
5	Involves conservation, rehabilitation or enhancement of habitat	5	5	25	10
6	Addresses a direct impact as a result of dam construction and inundation	5	10	50	5
7	Adequate/logical background and planning has been completed for the task	5	2.5	12.5	4
8	Addresses an urgent requirement or threat to population maintenance and/or habitat conservation	5	10	50	8
9	Cost effective task, a subjective, qualitative review of a high benefit to cost or risk ratio, and which involves value-added aspects	5	10	50	2
10	Encourages a coordinated basin-wide approach either in terms of methodology, the applicability of study results, or the enhancement of habitat productivity	5	2.5	12.5	4
11	Ease of implementation				2
12	Encourages innovation				2
	TOTAL			325	50

Suggested conditions for assigning ratings:

1. **Conservation of indigenous species and wild fish stocks:** This criterion is a major priority under the MoELP mandate and follows provincial policy. Secondary importance can be given to augmented or introduced stocks which satisfy angler demand, provided task actions do not impact wild stocks significantly and meet local MoELP management goals.
2. **Conserves or augments sensitive or valuable habitats:** This criterion provided support for those habitats which serve to conserve wild stocks of both sport and nonsport species. It also provides secondary support for introduced or augmented, but valuable, angled and/or harvested stocks and their related habitats.
3. **Improves or maintains local or regional species diversity:** This criterion serves to conserve existing biodiversity, but also allows for non-wild stock enhancement in presently barren or depopulated habitats, particularly those which are isolated.

4. **Ongoing or existing work requiring continuity to provide a benefit to the program:** Projects resulting in defensible habitat actions usually require a plan including background and design studies, construction plans and evaluation studies. This criterion recognizes the importance of this planning approach. It also recognizes that some projects may be staged in their planning and implementation while others must be continuous from planning to implementation in order to complete the project.

5. **Involves conservation, rehabilitation or enhancement of habitat:** Conservation, rehabilitation or enhancement which will protect or augment indigenous biodiversity receives the highest score. Secondary importance is given to habitat work which will contribute to the strength of sport fish stocks, including both wild and introduced species provided these projects meet local management goals.

6. **Addresses a direct impact as a result of dam construction and inundation:** This criterion recognizes that addressing water license requirements is a Program mandate and an objective of BC Hydro. Importance can, however, be given to off-site tasks (those outside the direct impact zone, but still within the Program area), especially where on-site opportunities are restricted. Such support is derived from the basin-wide mandate of the Program as dictated by the Steering Committee.

7. **Adequate/logical background and planning has been completed for the task:** As task development nears completion within the program, additional support should be provided to assure final construction and/or evaluation. In addition, tasks may come forward for which the necessary background work has been partially or fully completed outside the Program. Provided such tasks meet Stage 1 Acceptability Criteria (ie regarding transfer of liability), such tasks should be considered for priority approval.

8. **Addresses an urgent requirement or threat to population maintenance and/or habitat conservation:** This criterion is included to provide extra support for those species or habitats which are undergoing unforeseen or unresolved dramatic alienation or decline in abundance, respectively. It is directed to both designated endangered species, as well as important populations of sport species.

9. **Cost effective task, a subjective, qualitative review of high benefit to cost or risk ratio, and which involves value-added aspects:** Higher scores are given to those tasks which show evidence of getting the biggest benefit for the budget provided.

10. **Encourages a coordinated basin-wide approach either in terms of methodology, the applicability of study results, or the enhancement of habitat productivity:** Tasks which only benefit isolated local needs receive less support, while those which benefit wider geographic area or ecosystems within the Program area receive higher scores.

11. **Ease of implementation.** Project is easy to implement requiring a low staff commitment or will require significant staff commitment and coordination to implement.

12. **Encourage innovation.** Project is innovative, incorporating/developing new techniques.

STAGE 3 - STEERING COMMITTEE PROJECT CONSIDERATIONS

These project considerations are non-ranked and are utilized by the Steering Committee to capture socio-economic and geographic values.

1. **Is the Project consistent with the Program Strategic Plan.** In order to ensure the Program fulfills its mandate and maintains the direction it sets for itself, projects must be consistent with the strategic plan directions and objectives.

2. **Consider the financial impact of a task on the total Program budget.** The Program operates within the limits of a defined annual budget that funds four components of the Program, namely fish, wildlife, public communications and administration. Each project should be reviewed with an eye to how it affects the budget allocation within the individual components and between the components.

3. **Review the timeline impact of a task on the Program's ability to meet its mandate and/or *public* expectations.** Delivery of projects may span one fiscal year, several fiscal years or be an ongoing requirement to meet project evaluation needs. Commitments to a multi-year or ongoing project need to be reviewed for their impact on the Programs' ability to deliver other project work in future years, the contribution which that project makes towards fulfilling the Program mandate and how it may impact public expectations of the Program.

4. **Encourage the involvement of First Nations, community based groups and interested individuals.** Does the project have direct involvement or potential for direct involvement; volunteer and/or in kind contributions from First Nations; community based groups or interested individuals. The level of direct involvement or in-kind contributions and the impact on project delivery and benefit to the resource is considered.

5. **Review involvement of partnerships with other agencies, stakeholders or industry.** While the Program encourages project partnerships, it is important that those partnerships are compatible with the goals of the Program; do not divest agency or industry responsibilities to the Program; ensure that the commitment of those partnerships are clearly defined and do not impact on the ability of the Program to deliver projects in the future. This is of particular concern where multi-year project partnerships are proposed.

6. **Provide opportunities to raise public awareness and active support for the Program.** Projects can provide varying degrees of opportunities to raise public awareness of both the Program and its partners. Such recognition can be dependent on project location, number and type of partnerships, scope of public exposure, timeliness, local versus international significance, etc.

7. **Consider the geographic distribution of projects throughout the Program area.** The program does strive to take a basin-wide approach to project allocation and provide a balance of projects throughout the Program area. It is recognized that distribution of projects also has to be weighed against priorities and benefits to the resource but it is expected that a wide distribution of projects across the Program area will occur over time.

8. **Consider how a project might meet community and public values.** Projects may meet a variety of community and public values in a direct or indirect way. Depending on the type of project, previously identified community priorities, public feedback received and level of community partnership involvement, public values may be taken into account.

9. **Determine the likelihood of the task moving from study to action.** Does the initial study proposal indicate "next steps"? Have there been previous studies done on the same project or a similar project and did they lead to action? What timeframe is required to move the project from study to action?

Organization and Team Member Profiles

Columbia Basin

FISH & WILDLIFE
Compensation Program

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NELSON HEAD OFFICE

Public Representative: *Richard Spilker* Ph. (250)352-2660 spilk@direct.ca
Born and raised in the West Kootenays and nominated by the West Kootenay Outdoorsmen, Richard is an active member in Duck's Unlimited and the Nelson Rod & Gun Club. He is familiar with public needs regarding the management of fish and wildlife resources and is a strong advocate for conserving biological diversity and wisely managing habitats. Richard is also a lawyer with the skills to communicate effectively and help facilitate concensus decision-making.

Maureen DeHaan, *Program Manager*
Maureen holds a Bachelor of Science Honours Degree in Environmental Science from Murdoch University in Perth, Australia as well as a Diploma in Forest Technology from the British Columbia Institute of Technology (BCIT). Before joining the Compensation Program in 1994, she was Planning & Assessment Manager with BC Environment and an Environmental Forester with an environmental management firm in interior BC. Maureen is a Registered Professional Biologist and Registered Professional Forester.

Beth Woodbridge, *Administrative Assistant*
Beth joined CBFWCP in 1995 and has 18 years of administration experience with BC Hydro. She applies a broad range of administrative and public interaction experience to what she considers "the perfect job". As the front line person—the first voice you hear when you call the Nelson office—Beth views her role as: "I'm here to help people who are interested in the Program in what ever way I can".

John Krebs, *Senior Wildlife Biologist*
John has extensive experience in both wildlife management and technical forestry, particularly in the Columbia Basin region. A biology graduate from Simon Fraser University, he earned his Masters in Science Zoology from the University of Alberta as well as a Diploma in Fish, Wildlife & Recreation from BCIT. An active member of the Western Forest Carnivore Committee and the North Columbia Mountain Ecological Research Group, John has published over 15 reports on his research work. He has been with compensation programs in the Columbia Basin since 1992. John is a Registered Professional Biologist.

John Gwilliam, *Wildlife Biologist*
A wildlife biologist with compensation programs in the Columbia Basin since 1980, John has a broad range of hands-on wildlife management, habitat enhancement and public involvement experience throughout the area. He was involved in the Pend d'Oreille Wildlife Management Plan as well as developing timber harvesting plans and prescribed burns programs as habitat enhancement techniques. A graduate of the University of Victoria in Biology, John has published a series of reports on his research and programs in the Columbia Basin.

Harald Manson, *Senior Fisheries Biologist*
A graduate of the University of British Columbia with a Bachelor of Science in Zoology, Harald spent 27 years with the Ontario Ministry of Natural Resources before joining CBFWCP. His last position at the Ministry was Operations Supervisor, overseeing the delivery of aquatic research and assessment programs on Lake Erie and Lake St. Clair.

Steve Arndt, *Fisheries Biologist*
Steve has been involved in fisheries-related work in Ontario and New Brunswick since 1982. A Masters of Science graduate from the University of New Brunswick, he is the author of a number of reports on salmonid growth and field assessment. Steve's main interests are fish population dynamics and fisheries management.

Bob Lindsay, *Regional Fisheries Biologist*
Bob is responsible for all fisheries management in the West Kootenay for the Ministry of Environment, Lands and Parks and has been dealing with fisheries management issues in the Kootenays for 25 years. A graduate from the University of British Columbia with a Bachelor of Science in Biology, Bob is also a Registered Professional Biologist.

John Bell, *Fisheries Technician*
John is a graduate from Lethbridge Community College's Renewable Resource Management Program with a Fisheries Technician diploma. He worked with the Provincial Fisheries Branch in Williams Lake, Cranbrook and Prince George prior to relocating to Nelson in the late 1980's.

Grant Thorp, *Fisheries Technician*
Grant graduated from Selkirk College in 1980 with a technical diploma in Renewable Resources. He has worked at the Hill Creek Hatchery & Spawning Channel since 1979.

Diana Koller, *Hill Creek Hatchery Supervisor*
Diane has worked in fish culture in BC fish hatcheries since 1980 and at Hill Creek Hatchery and Spawning Channel since 1986. She graduated from BC Institute of Technology's Fish, Wildlife and Recreation Program in 1984.

Bob Millar, *Fisheries Technician*
Bob, a graduate from Selkirk College's Fish, Wildlife & Recreation Program in 1990, has been working at Hill Creek Hatchery since 1989.

Ross Clarke, *Contract Wildlife Biologist*
Ross has a broad range of experience in both wildlife enhancement and forestry in British Columbia and Alberta. A graduate of the University of Alberta with a Bachelor of Science in Forestry, he has spent 15 years as a consultant for both government and private industry. Ross has worked with the Compensation Program since 1995. His main interests are in habitat enhancement/restoration and wildlife management.

Ian Parfitt, *Contract GIS Coordinator*
Ian Parfitt graduated from the University of BC with a Bachelor of Landscape Architecture in 1990. He has been using computer-based geographical information systems (GIS) to support ecosystem and species conservation in BC for eight years, the past four years with CBFWCP. Ian has also worked with the Geography Department at UBC and the Long Beach Model Forest Program in Ucluelet.

Barry Bartlett, *Contract Public Communications Coordinator*
Barry is a photojournalism graduate from Vancouver's Langara College with several years experience in BC community newspapers and 13 years in communications in the energy, manufacturing and forestry sectors prior to joining CBFWCP in 1997. He has received professional recognition for his work including best newsletter in Canada and, as part of a team, best corporate communications program internationally.

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Public Representative: ***Jim Zimmerman***, Elkford Ph. (250) 865-4556 Fax (250) 865-2343
Jim has been a public representative since CBFWCP's inception in 1995. He was appointed because of his involvement with the Elkford Rod & Gun Club, his understanding of local fish and wildlife issues and his demonstrated ability to bring together different groups to work on a common goal and achieve results. Jim was actively involved in the 1998 acquisition of the 88-ha Musil property for its wildlife values and opportunities for conducting hands-on habitat enhancement activities. He also instructs courses in firearm safety and hunter training.

First Nations Representative: ***Joe Nicholas***, Windermere
Ph. (250) 342-6301 (Columbia Lake Band Office); (250) 342-6301 (home)
Joe was appointed by the Ktunaxa/Kinbasket Tribal Council, which includes the Columbia Lake, Lower Kootenay, St. Mary's, Shuswap and Tobacco Plains bands. A chief of the Columbia Lake Band for 15 years and currently a band councilor, Nicholas was a member of the Columbia Basin Trust Committee and serves on the Canadian Columbia River Inter Tribal Fisheries Commission. Nicholas has had a lifetime interest in wildlife and wants to help address conservation issues resulting from the dams and growing economic development of the region.

Larry Ingham, *Wildlife Biologist*
Larry has been involved in wildlife compensation programs in the Columbia Basin since 1992. As well, he has extensive experience in the region as a wildlife biologist for BC Environment, BC Conservation Foundation and the Kootenay Wildlife Heritage Fund. Larry is a Simon Fraser University graduate in Biology and a BC Institute of Technology graduate of the Fish, Wildlife and Recreation Program. His habitat enhancement proposals have been recognized with two awards of excellence from the Habitat Conservation Trust Fund. Larry is a Registered Professional Biologist.

Cheryl Persson, *Contract Administrative Clerk*
Cheryl has been overseeing the administration of the Invermere Office since joining the Compensation Program in 1996 from Alberta where she worked for the University of Calgary and in the oil and gas industry. She has an extensive background in computers and accounting and has been instrumental in developing and maintaining the Program's data management system. Cheryl is also a volunteer fire fighter.

Bill Westover, *Regional Fisheries Biologist*
Bill has worked as a fisheries biologist for the Ministry of Environment for 27 years and is responsible for fisheries management in the East Kootenays. Bill has a Bachelor of Science in Biology from the University of Victoria and is a Registered Professional Biologist. Much of his work over the last 5 years has focused on bull trout in the upper Kootenay drainage including the Wigwam River and Skookumchuck Creek.

Doug Adama, *Contract Wildlife Biologist*
Doug has worked as a contract biologist for the Compensation Program for 5 years. A lifetime resident of the Columbia Valley, he holds a Bachelor of Science in Biology from the University of Victoria. He has worked extensively on habitat enhancement and grassland ecosystem restoration projects throughout the Columbia Basin.

Dave Lewis, *Contract Wildlife Technician*
Dave, a graduate of Lakeland College's Environmental Science Program with majors in fish and wildlife, worked with the Mica Compensation Program before joining CBFWCP in 1995. A certified trapper and immobilization/animal handler, Dave works on a range of predator and large mammal projects as well as conducts many of the monitoring and surveying activities relating to Program wildlife projects in the southeast and northern Kootenays.

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Public Representative: ***Pat Wells***, Revelstoke Ph. (250) 837-5792
Pat is a 17-year Revelstoke resident with extensive fish and wildlife conservation experience including chair of the Revelstoke Rod & Gun Club Habitat, Access and Land Use Committees; director of the BC Wildlife Federation and BC Conservation Foundation; founder of the North Columbia Resource Council; and a member of the CBFWCP Revelstoke Public Advisory Committee. Pat has also been participating in a variety of conservation projects such as wildlife mortalities on transportation corridors and grizzly bear management.

Karen Bray, *Fisheries Biologist*
Karen has a Masters of Science in Watershed Ecosystems from Trent University in Ontario and a solid background in the theories, principles and practices of aquatic sciences and habitat rehabilitation. She also has extensive training and experience in methods of assessing and managing habitat, fish populations and environmental impacts. Karen is the author of numerous publications and presentations on aquatic habitat conservation and restoration. Karen is a Registered Professional Biologist.